

# **Experiment on LAue Cu Lens imaging and POLarimetry with CADmium telluride Array (LaPOLCA) ESRF**

**Internal Report IASF/BO n. 524/2008  
(August 2008)**

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## **I. Aim of the Document**

This document describes the LaPOLCA experiment at the ESRF, held at the beam line ID15 B from 1<sup>th</sup> March to 4<sup>th</sup> March 2008 for a total of 9 shifts.

The aim of the experiment was to demonstrate that the combination of a Laue Lens (LL), made of mosaic copper crystals with a CZT/CdTe pixel detector, is capable to perform measurement of the polarisation (above 100 keV) of an hard X-ray sources contemporary with spectroscopy and imaging and in particular that the Laue diffraction process does not affect the photon polarisation status introducing systematic effects.

In this document we will present the results of the calibration phase of LaPOLCA, the experimental set-up at the ESRF, the performed tests and the details of the improved detection system.

## **II. Reference Documents**

The following is a list of the documents that should be considered as reference for the La-POLCA tests (Experiment MI-905) at the beam-line ID15B of the ESRF in Grenoble.

- D1. Polarimetria con CdTe Array, INAF/IASF-BO IR 345, 2002
- D2. POLarimetry with Cadmium telluride Array (POLCA), ESRF Experiment No MI-592 Report.dat
- D3. POLarimetry with CZT Arrays: experimental set-up, calibration procedures and results. INAF/IASF-BO IR 444, 2006.
- D4. POLCA II (POLarimetry with CZT Arrays) USER MANUAL for ESRF 2007 tests. INAF/IASF/BO IR 464, 2007.
- D5. La-POLCA proposal (MI905) to ESRF n. 16627, march 2007.
- D6. Report ESRF Experiment n. MI-854, August 2008.

## 1. LaPOLCA detector system configuration and calibration

### 1.1 *Introduction*

LaPOLCA was a follow up to two previous experiments (POLCA I & II) devoted to assessing and verifying the performance of CdTe/CZT arrays as scattering polarimeters for use in hard X- and soft gamma-ray astrophysics.

The detection system comprises the CZT pixel spectrometer with the analogue front end electronics, the data processing electronics and the data acquisition system.

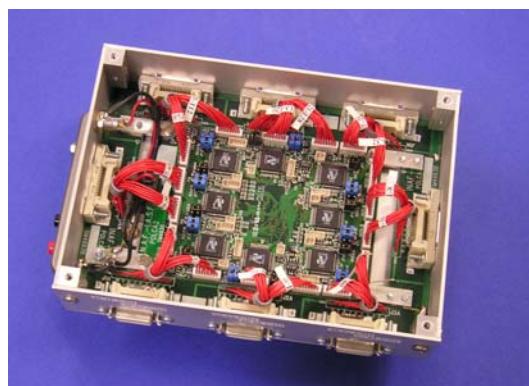
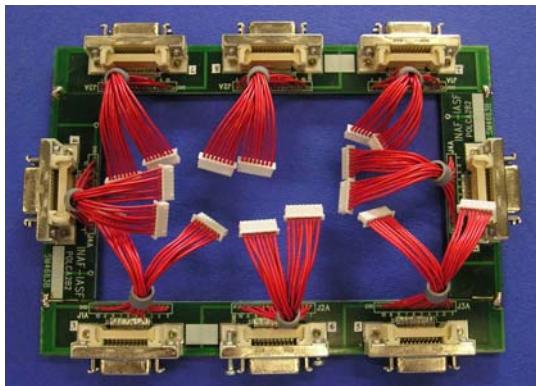
For the LaPOLCA detection system description we refer to the IASF-BO IR 444, 2006 and 464, 2007.

### 1.2 *The POLCA detector system upgraded configuration*

The POLCA II experiment in February 2006 have shown a critical dependence of the detection system noise on the electrical disturbs generated by the movement motor, that required to switch off all the motors bias before each measurements . In order to solve this problem or at least to drastically reduce this influence we have decided to modify the ASIC board container using a metallic box instead of the original graphite shielded plastic one (Figure 1 right). Furthermore we have eliminated the small (red) signal cables used to connect the ASIC outputs with the data output connectors that in the POLCA II design were located almost outside the ASIC board box, by means of an electrical I/F, inside the same FEE container, that provide the connection between the external data connectors and the ASIC channels outputs (Figure 1 left).

In details the following modifications with respect to the detection system design used in the POLCA II experiment have been applied:

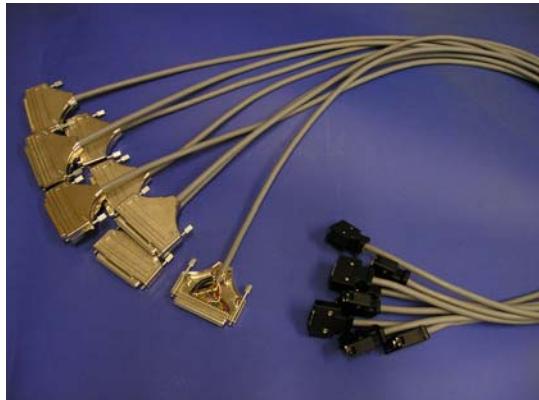
1. A new metallic box for ASIC board and the new electrical I/F towards the signal output connectors was built
2. A new electrical I/F to made a direct, shielded, connection inside the new front-end metallic container between the ASIC output tracks and the new data output connectors.
3. New type of connectors (eV Multipixel type) have been used in the ASIC electronics box reducing their number from 16 to 8 (one connector for one ASIC) (Figure 1, left).
4. A set of 8 new shielded cable have been made to connect the front-end electronics high density connectors to the 37 pin Canon type input connectors of the TAKES electronics. Only 8 data



**Figure 1.** (left) The new electrical I/F used to connect ASIC's with the new data cables; (right) the new metallic box for the POLCA FEE board.

cables instead of the 16 ones used in the POLCA II (Figure 2, left). A more flexible shielded cable has been used to allow more freedom of movement during beam tests.

5. The 12 kΩ resistors have been moved from inside the ASIC box to the connection between data



**Figure 2.** The new data cables and connectors (left); the new 12 kΩ resistor set at the end (TAKES) of the data cable (right).

cables and TAKES input connectors. 8 sets of 12 kΩ resistors have been built (Figure 2, right).

### 1.3 **Operative setting, calibration and equalization at IASF-BO**

#### 1.3.1 **ASIC Operative setting:**

The pixel readout is provided by eight eV products 16-channel ASICs that have both peaking time and gain settable by two set of micro-switches on the ASIC board [D4]. The values of these operative parameters have been chosen in order to handle the desired input signal dynamics (i.e. the operational energy range) during ESRF and Laboratory tests. The chosen parameters allow operating the detector system up to ~350 keV with the 12 kΩ resistors set and up to 450 keV with the 15 kΩ resistors.

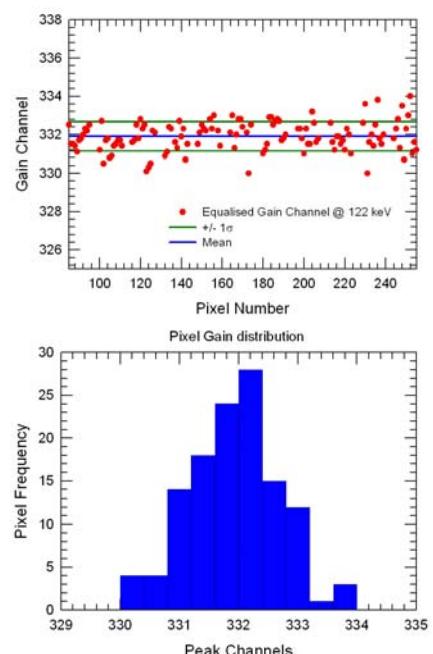
Parameter	Selectable Values	Set Value
Gain	33/50/100/200	<b>100</b>
Shaping time	0.6/1.2/2.4/4	<b>1.2</b>

**Table 1.** ASIC Operative parameter.

#### 1.3.2 **Multiparametric Electronics chain equalisation**

All the pixel channel of the POLCA detector system has been equalized at the IASF-BO Solid State Detector laboratory using a <sup>57</sup>Co radioactive source. The source was placed, uncollimated, few cm above the POLCA detector cathode. To equalize the gain of each pixel channel we used the trimmers that are available on each analog channel of the TAKES boards.

Using as reference line the 122 keV photopeak, we have equalized the gain of each pixel chain to have the peak centroid on channel  $331 \pm 2$  using the acquisition s/w tool (see Appendix A for the values and Figure 3). More details on the LAPOLCA equalization are given in Appendix A, where the peak position after the equalization are given with some few comments on the



**Figure 3.** 122 keV photopeak channel after the gain adjustment: a) gain pixel equalization b) gain pixel histogram.

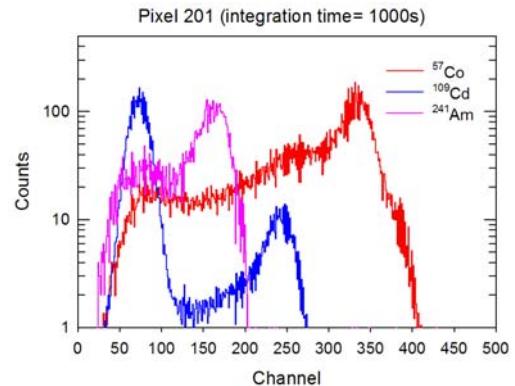
relative efficiency uniformity for each pixel channel divided in ASIC chip group/TAKES board.

### 1.3.3 Detector system calibration

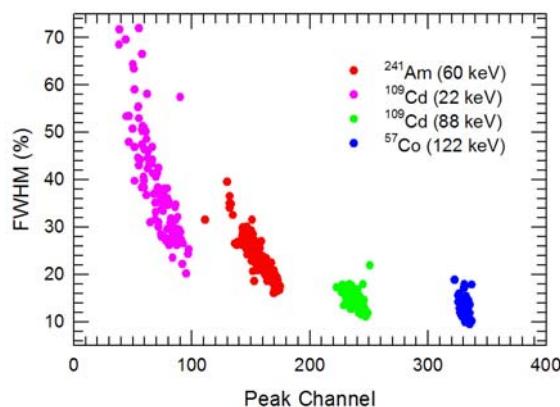
As second step, the detector unit was calibrated using radioactive sources with different energies in order to study the spectroscopic response and to obtain the calibration line (channel vs energy) to verify the response linearity (at least within 10%), of each pixel/channel.

During these phase we have used three un-collimated radioactive sources (Figure 4) positioned at ~10 cm from the POLCA detector surface:  $^{57}\text{Co}$  (122 keV),  $^{109}\text{Cd}$  (22 and 88 keV), and  $^{241}\text{Am}$  (60 keV). More details on the POLCA calibration are given in Appendix A .

The Figure 5 report the distribution of the measured energy resolution (FWHM %) of all the detector active pixels/channels across the detector, while in Figure 6 are plotted the parameters of the calibration straight line for each



**Figure 4.** Spectra of the radioactive sources used to calibrate the POLCA detector in the laboratory.



**Figure 5.** The distribution of energy resolution (FWHM %) of all the detector active pixels/channels.

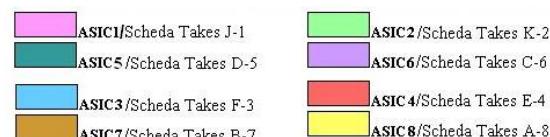
pixel/channel.

### 1.3.4 LaPOLCA detector status at the begin of the ESRF test campaign



**Figure 7.** The ASIC chip/pixel association for the POLCA II detector.

In the Figure 7 is shown by a colour code the association between each ASIC and the corresponding group of 16 pixels. In Table II are reported the pixel/channel chains that exhibit a noisy and/or unstable behaviour before the ESRF.



Dead	Noisy/Unstable
136	148
134	134
87	

**Table II.** Pixel health status before the ESRF campaign.

## 1.4 Data Acquisition Control and Quick look S/W

The multiparametric back-end electronics is able to read up to 128 independent channels with filters, coincidence logic and ADC units. This system is connected, through a high speed 32 bit parallel NI-DIO/PXI board, to a PC with quick-look and storage s/w developed in LABVIEW.

In the following sections are briefly summarized and described the improvement introduced in the TAKES electronics output data format as well as the update on the Data Acquisition Control and the new Quick look package.

#### 1.4.1 Data format in LaPOLCA Experiment (ESRF/2008)

For the LaPOLCA experiment a new functionality have been implemented in the TAKES electronics in the ADC board, in order to made the analysis of data (in particular data obtained in scanning mode). This functionality is a relative time counter that gives the temporal distance between an event and the successive one. The current implementation of the time counter use a 1.25 MHz clock (4 times the internal 5 MHz clock) providing a time resolution of 0.8  $\mu$ s. The time counter use 11 bits (+1 for time overflow) that are implemented in the MSB of data output 32 bits word as shown in Table III. The available number of bits allow up to  $\sim$ 1.6 ms (i.e.  $\sim$  600 counts/s) as maximum temporal distance between two subsequent events. More details on the new time counter are given in Appendix B.

MSB	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	LSB
TO	TIME (0-2047)	PIXEL ID (0-255)	EE	EO	ENERGY (0-1023)																												

Data Field	Notes
ENERGY	Energy of the hit given in channels between 0 and 1023
EO	Energy overflow flag: 0=good event; 1=energy overflow
EV	End of Event flag: 1= the hit belong to a multiple event; 0=last hit of an event or single events
PIXEL ID	Pixel identifier given in 8 bits
TIME	Time intervals between two subsequent events (11 bits). The time in s is obtained by multiplying this value by 0.8 $\mu$ s. The TIME value is always the same inside the same event: i.e. the hits of a multiple event have the same value.
TO	Time overflow flag: this flag is set to 0 if the time interval is less than 0.8*2048, while is =1 (overflow) in the opposite case.

**Table III.** Data format.

#### 1.4.2 The POLCA Data Acquisition Control and Quick look tools upgrades

The LABVIEW tool is *POLCA\_Acquisition.vi*. This s/w tool allows controlling the data acquisition during tests and providing the data recording on files with different format. The improvements with respect to the Data Acquisition Control version 2007 (see D4), implemented in the upgraded acquisition s/w tool for the TAKES 128 channel multiparametric electronics are:

1. **Data output format:** mainly as a consequence of the complete filling of the TAKES data word with the time counter introduction, we definitely decide to use the same format for the data written in the user files.
2. **Test/Acquisition mode switch:** in Test mode the data are acquired, visualized, but not stored permanently in a user file, while in Acquisition mode the data storage is enabled. This functionality has been implemented to avoid the generation of non required data files during the measurement set-up, e.g. during the pixel centring phase.
3. **End of measurement alarm:** at the end of the current measurement the s/w will provide a customisable (through a change in the code) sound alarm.
4. **Pixel on/off switch:** we have modified the method for the s/w on/off of pixels in the colour counts map. Now this functionality is enabled by a switch beside the map and the on/off of the desired pixel is obtained by selecting it with the cursor and pressing the left mouse button.
5. **Colour counts map scale:** Now is possible to switch the colour counts map scale between linear and logarithmic intensity. This function is useful to enhance the visibility of counts distribution features in particular when there are strong differences in counts.
6. **Pixel neighbours barycentre:** in order to help user during the beam centring phase on a given pixel, we have implemented a function that give in an array of  $2\times 2$  indicators (in the colour map panel) the number of counts in the pixel pointed by the cursor (in the left upper indicator) and in the three neighbours pixel.

In Appendix C the block corresponding to the improvements implemented in the acquisition s/w are reported in more details.

The LABVIEW POLCA\_Quicklook.vi allow to replay the data files recorded by the Data Acquisition Control program and provide several functionalities for a quick look data quality checking and results evaluation. In the current version the code has been modified to be able to read the new data file format (see section above).

## 2 LaPOLCA setup at ESRF Beamline ID 15B

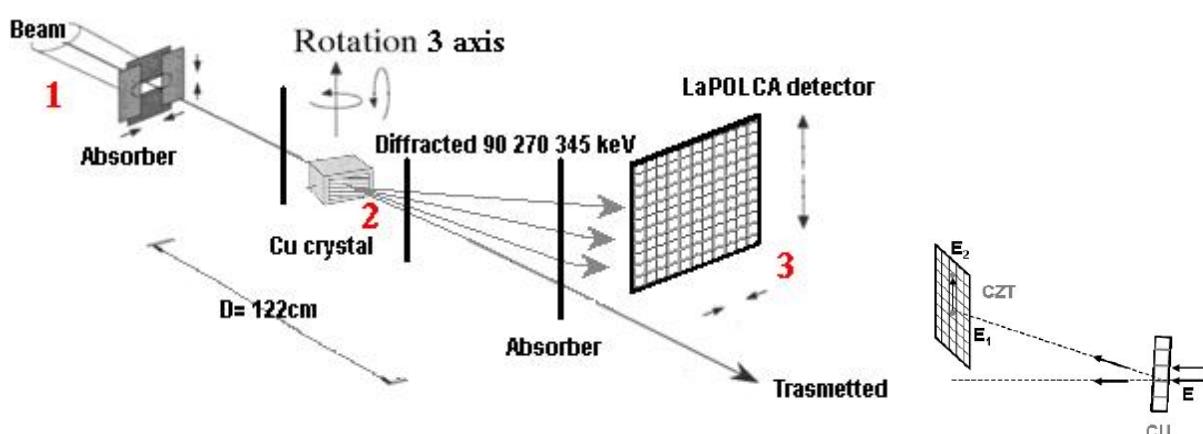
### 2.1 LaPOLCA set up scheme

The beam from the Storage ring enters in the **optics hutch** where it is collimated, monochromatised, and eventually reduced in intensity. Finally the beam enters the **experimental hutch** where the user experiment is set-up (see D4).

The LaPOLCA experiment was set-up in the experimental hutch at about ~5 m from the beam entrance window on a micrometric positioning and rotation system (see below).

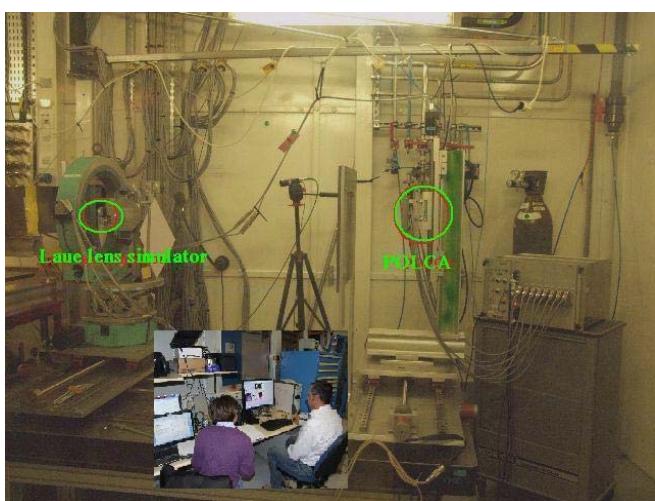
The experiment we performed was based on three main subsystems: **1** the beam line, **2** the Laue Lens simulator (Cu crystals, named as LL in the following) and **3** the detection system.

The general LaPOLCA experiment set-up scheme is shown in Figure 8.



**Figure 8.** LaPOLCA experiment set-up scheme. On the right the CZT surface where is represented an event that is scattered form the target pixel to a separate one losing energy  $E_1$  and  $E_2$ .

All the LaPOLCA subsystems (detector, power supply, multiparametric electronics, Laue lens simulator) have been mounted inside the experimental hutch, leaving in the control room only the NI PXI box with the NI6533 data acquisition board and the ESRF control console and the Quick-look station (PC), Figure 9.



**Figure 9.** Experiment at ESRF optic hutch and the control room with control console.

The detector unit was mounted on a computer controlled 2-axis and micro positioning system at 122 cm from the Cu crystal system (Fig. 9). The distance was large enough to have from ~10 to 3 cm (from 90 keV to 345 keV) separation between the diffracted and the transmitted beam on the detector surface. This separation allowed the transmitted beam to be interrupted by using a lead shield between the Cu crystal and the plane of the detector unit thereby avoiding to project shadow on the detector surface.

## 2.2 The ID 15B beam

The ID15B beam line at ESRF allows the production of polychromatic (100%) linearly polarised radiation at energies of ~90 keV, 270 keV, 345 keV, and superior harmonics (with very low intensity and outside the detector response dynamics) with a square spot diameter of  $0.3 \times 0.3$  mm $^2$ .

0.3 x 0.3 mm spot size
~100% linear polarized
Polychromatic beam: 90 keV primary, 270 keV (3rd harmonics), 345 keV (4th harmonics).
Beam attenuator: Pb (5 mm) + Cu (4 mm)

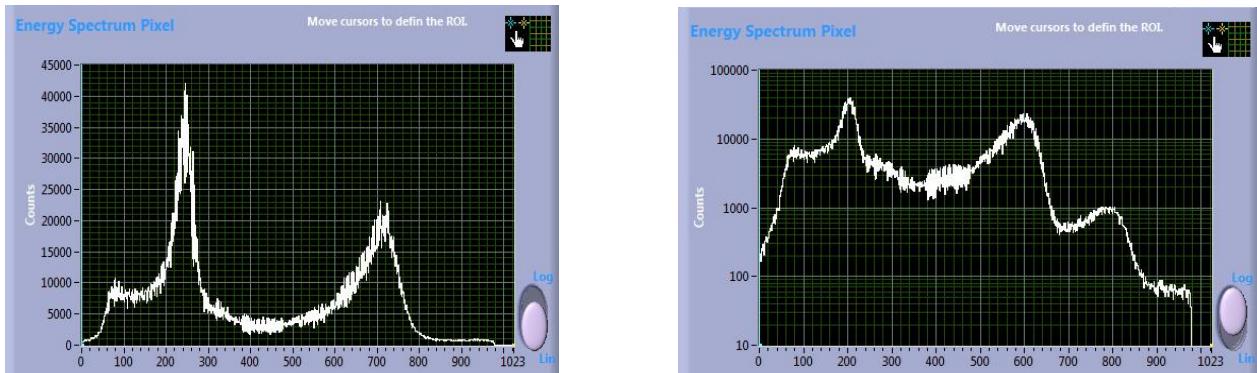
**Table IV.** Beam Characteristics.

In order to avoid signal-pileup and dead time increase in the detection electronics because of the high beam intensity we have used during all the measurements a graded shield made of Pb/Cu at the beam entrance in the experiment hutch. With this shield we were able to limit the detector count rate always below 15000 c/s. The details of the passive shield used are reported in Table V. The relatively low intensity of the diffracted beam @ 90 keV with respect to 270 keV is due to the presence of attenuator (Pb+Cu) between the beam and the Cu crystal 90 keV

Figure 10 shows the transmitted beam as seen by pixel 201 of the CZT detector at the first two allowed harmonics (1<sup>st</sup> and 3<sup>rd</sup>, the 2<sup>nd</sup> being forbidden by the Ge mono-chromator used to produce the beam at ID15B). The fourth beam harmonic at 345 keV was also used after substituting the 12 k $\Omega$  resistors with 15 k $\Omega$  on the detector data cables in order to increase the operational energy dynamics.

Energy	Shield type and characteristics
90 keV	Pb(5 mm) + Cu(3 mm)
270 keV	Pb(5 mm) + Cu(3 mm)
345 keV	Pb(4 mm) + Cu(3 mm)

**Table V.** Absorbers configurations used during the beam test at different energies.

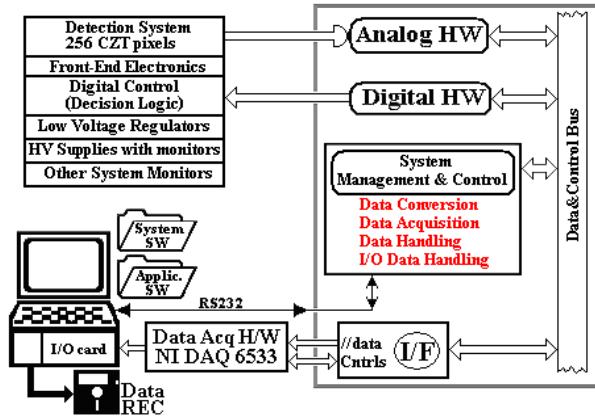


**Figure 10.** Transmitted (through the Cu mosaic crystal) beam spectra (pix 201) with two different gain to change the detector dynamics accumulated in 1000 s.

During the Laue lens simulation measurements, we have used a thick shield made by Pb (10 cm thick) bricks positioned close to the Cu crystal in order to completely absorb the transmitted beam and to be sure that do not intercept the POLCA detector in any position (see Figure 13).

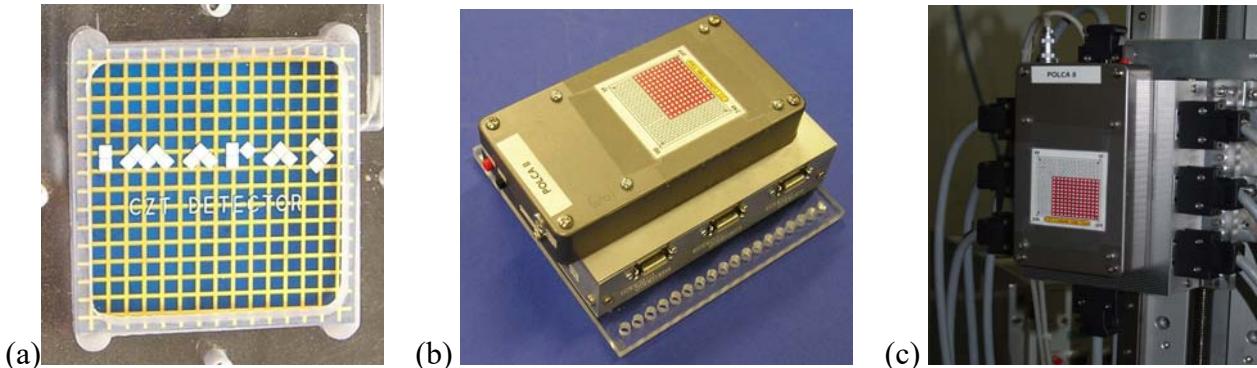
## 2.3 LaPOLCA detection systems

The detection system is schematically represented in Figure 11 and comprises the pixel spectrometer with the analogue front end electronics, the data processing electronics and the data acquisition system.



**Figure 11.** The functional scheme of the detection system: (left top box) the CZT pixel detector with the Analogue front-end electronics; (right box) the multiparametric data processing electronics; (bottom right icons) the data acquisition system.

POLCA (Figure 12) is based on a 5 mm thick CZT crystal with the anode segmented into  $16 \times 16$  pixels ( $2.5 \times 2.5 \text{ mm}^2$ ) from Imarad. In the current configuration only an array of  $11 \times 11$  pixels (sensitive area of  $3 \times 3 \text{ cm}^2$ ) is connected to the readout electronics. The pixel readout is provided by eight eV PRODUCTS 16-channel ASICs with peaking time set at  $1.2 \mu\text{s}$ . The HV bias for the detector (-600 V) is provided by a DC-DC converter (EMCO), while the low tensions for both the ASIC's board and the DC-DC converter are generated by an external custom made power unit.

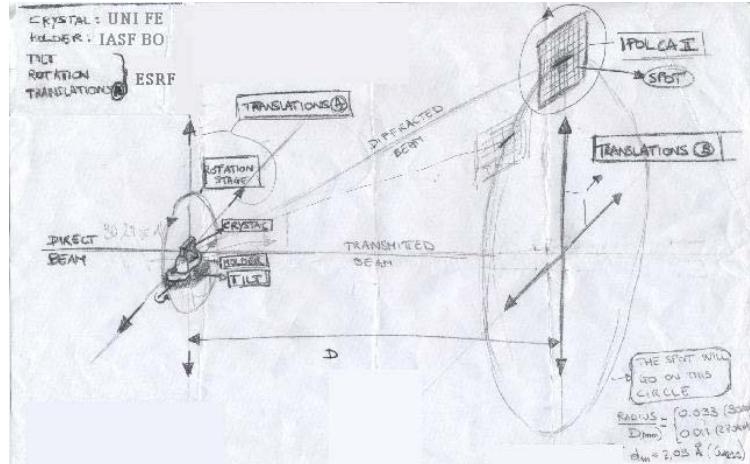


**Figure 12.** The LaPOLCA detector unit(b): the top box contains the Imarad CZT pixel detector (a) and the DC-DC converter for the HV bias, the position inside being indicated by the drawn mask on the top surface; the bottom metallic box contain the front end board with the 8 eV PRODUCTS ASIC, each connected to one of the 20 pins mini-ribbon connectors visible on the box sides. The detection system has been mounted through a mechanical plexiglass (c) interface inside a rotational stage on a XYZ positioning system.

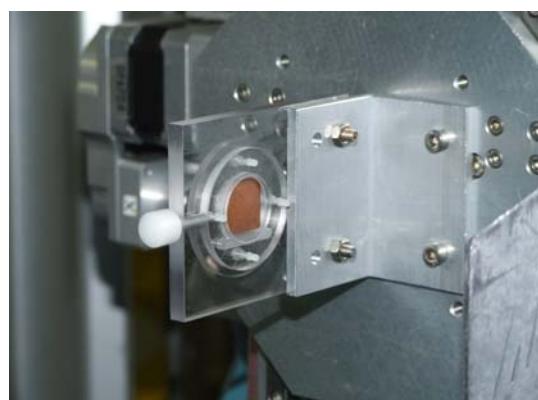
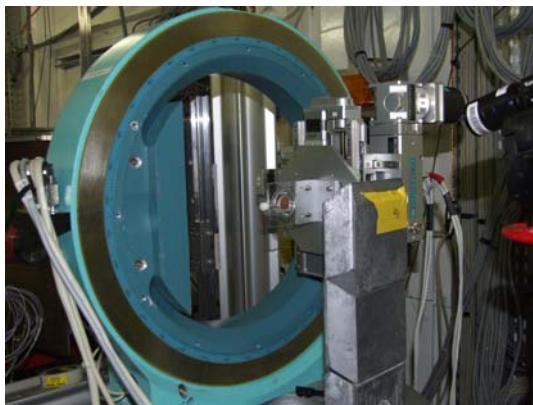
The multiparametric back-end electronics is able to read up to 128 independent channels with filters, coincidence logic and ADC units. This system is connected, through a high speed 32 bit parallel NI-DIO/PXI board, to a PC with quick-look and storage s/w developed in LABVIEW.

## 2.4 The Laue lens simulator

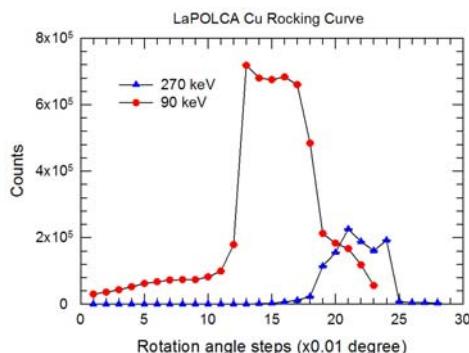
An LL is a set of properly oriented crystals. In our experiment it was emulated by using a single crystal that was rotated and placed in the correct positions in front of the beam. The Cu crystal was mounted on a 3 axis linear motion stage coupled with a 2 axis rotation stage to properly align the Cu crystal 111 surface (Figure 14) with respect to the incident beam and to perform the rotation of the crystal itself around the virtual axis of the LL. In this way it was possible to emulate the equivalent of three Laue rings - one for each available energy.



**Figure 13.** A artistic layout of the Laue lens simulator set-up inside the experimental hutch of the ID15B beam line at ESRF.



**Figure 14.** The large blue ring (left) provide the rotation around directions parallel to the beam axis, while the small rotation stage below the crystal support allow to modify the angle between the beam and the Cu crystal surface. The XYZ translator allows re-centering the crystal with respect to the beam after each movement and rotation. On the first plane the Lead brick shield used to stop the transmitted beam is visible. The Laue lens simulator basic element (right), the mosaic Cu crystal provided by ILL in Grenoble, inside the Plexiglas support.



**Figure 15.** The Cu crystal rocking curve obtained with two energies that was used to confirm the value of its mosaicity degree.

Furthermore, the advantage of emulating a LL with one crystal is that the mosaic structure is fixed, therefore avoiding additional effects due the intrinsic spread of this structure in a Cu crystal sample. The Cu crystal (4 mm thick and 15×15 mm<sup>2</sup> in surface) was provided by the Institute Laue-Langevin (ILL) in Grenoble in a sample of about 25 units used at the University of Ferrara to build a Laue lens demonstration model. Figure 14 (right) shows the Cu crystal inside the Plexiglas support built to connect it to the micro positioning system. Figure 15 shows the rocking curve (integrated diffracted beam intensity vs.

crystal surface orientation) obtained at the ID15B beam line using the 90 keV and 270 keV lines with rotation steps of 36°. These curves were used to evaluate the mosaicity level of the crystal, and the value of ~3' (Full Width Half Maximum) is in close agreement with the value reported by the ILL. In Appendix D the data file corresponding to this type of measurement are given with some more details about the used settings.

### 3 The LaPOLCA Tests

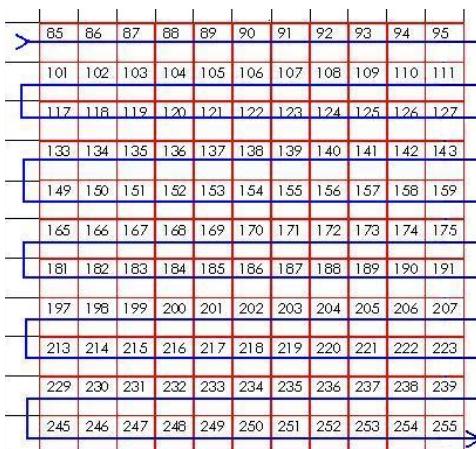
The experiment had two main strictly related targets:

- (a) to demonstrate that the combination of a Laue Lens (LL), built with copper crystals with a CZT/CdTe pixel detector, is able to perform high sensitivity measurement of the polarization of an hard X ray sources contemporary with spectroscopy and imaging of the same source;
- (b) to evaluate possible systematic effects on the polarisation status of incoming photons introduced by the Laue diffraction process.

This chapter will describe the LaPOLCA performed tests using the beam line ID 15B at the ESRF. For each test type the objective as well as the required set up and measurement condition and typical integration time are given.

The measurements are divided in two main classes: (a) Simulation of Laue lens ring; (b) Polarimetry with a polychromatic beam.

#### 3.1 Pixel scans for response non uniformity correction.

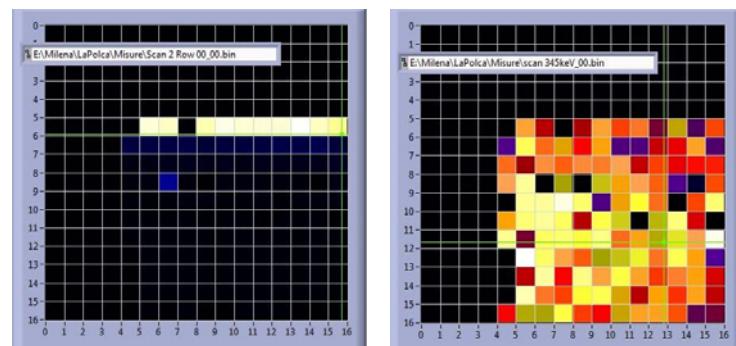


**Figure 16.** The path used for the pixel scan test types.

the left of the left top corner pixel of the active detector array, and then using the XY micrometric positioning system the detector will be moved in order to scan all the pixels following a path like the one shown in Figure 16. The measurement time at each reached pixel was, generally, set to 20 s in

These are preliminary measurements performed in order to determine the response of each LaPOLCA pixel at selected energies and to allow during the polarisation data analysis to normalize the pixel response. In particular the single events acquired during these tests will be used to correct the double event data for efficiency and gain non uniformity across the active detector surface.

This test type consist of scans over all the 11×11 detector pixels with a fine collimated beam for each energy that will be used for polarimetric measurements. At a given energy each scan start at the centre of pixel at



**Figure 17.** Single scan and scan macro.

order to have enough statistics: assuming an average count rate of 1000 c/s (consistent with 90 and 270 keV diffracted beam intensities), we will acquire  $\sim 2 \times 10^4$  counts, this number of course depending on the beam energy.

We point out that the introduction of the time counter in the TAKES output data words have allowed the implementation of complex scan macro (Figure 17) over the entire active detector surface, because using this time information we can reconstruct more precisely the number of events accumulated when the beam is just centred in each pixel, discarding the time interval when the beam is moving across on pixel and the subsequent.

This type of measurements have been repeated at the begin of each Laue lens ring simulation (see section below) and the corresponding data file and some more setting details are given in Appendix C.

### 3.2 **Simulation of a Laue lens ring**

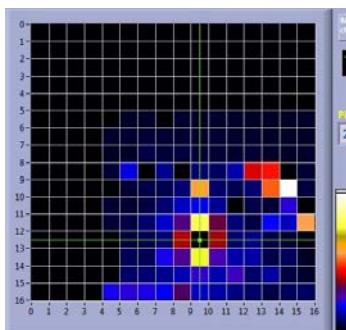
For each available energy in the incoming beam, we found the Laue diffraction condition for the given Cu crystal 111 surfaces. We then rotated the crystal around directions parallel to the axis beam to simulate a Laue ring (Figure 18) comprising 16 elements (one every 22.5°).

For each Cu crystal configuration the detector was moved in order to intercept the diffracted beam always with the same pixel (201) in the central part of the sensitive surface. In this way it was possible to emulate the equivalent of three Laue rings one for each available energy lines. Furthermore, the advantage of emulating a LL with one crystal is that the mosaic structure is fixed, therefore avoiding additional effects due the intrinsic spread of this structure in a Cu crystal sample.

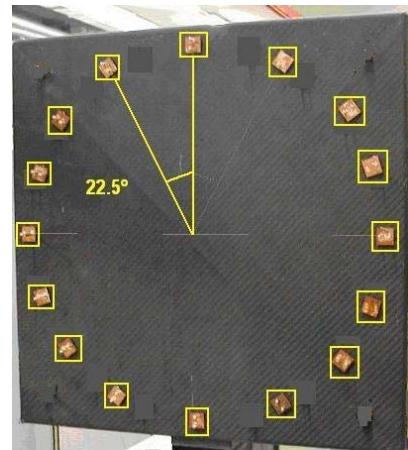
Figure 19 shows the diffracted beam as seen by pixel 201 of the CZT detector at 270 keV.

In Figure 20 the detected monochromatic diffracted spectra at the first three allowed harmonics (1<sup>st</sup> and 3<sup>rd</sup>, and 4<sup>th</sup>, the 2<sup>nd</sup> being forbidden by the Ge mono-chromator used to produce the beam at ID15B). The fourth beam harmonic at 345 keV was obtained after substituting the 12 kΩ resistors with 15 kΩ on the detector data cables in order to increase the operational energy dynamics.

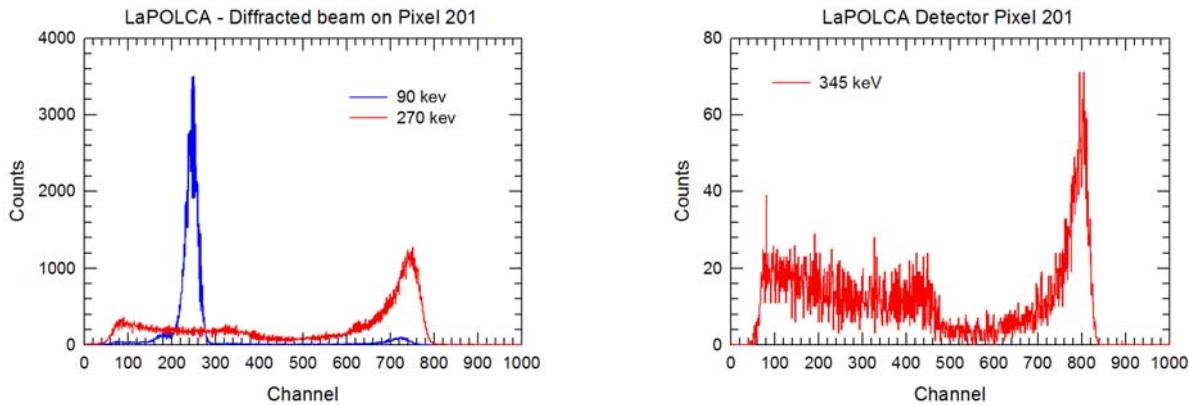
The detected intensities of the three diffracted beam lines were indicatively: ~950 c/s at 90 keV, ~1500 c/s at 270 and only 85 c/s at 345 keV. The relatively low intensity of the diffracted beam at 90 keV can be mainly attributed to the higher stopping efficiency of the Pb (5 mm thick)/Cu (4 mm thick) shield at the beam entrance in the experiment hutch (used to limit the incoming flux in order to avoid signal-pileup and dead time increase in the detection electronics) and higher self absorption across the 4 mm thickness of the Cu crystal at this energy with respect to the higher one: at 90 keV about 85% of the incoming beam is absorbed while at 270 keV this percentage is only 47%.



**Fig. 19.** diffracted beam on the Pixel 201 centre.



**Figure 18.** A reconstruction of the simulated 16 elements Laue lens ring during the test using as background the carbon fiber support of the demonstration model built at the Ferrara University.



**Figure 20.** The spectra of the diffracted beam as detected by the pixel 201 of the CZT detector for 90 keV and 270 and 345 keV incident beam harmonics. The acquisition time is 120 s.

In Appendix C the data file corresponding to this type of measurements are given with some more details about the used settings.

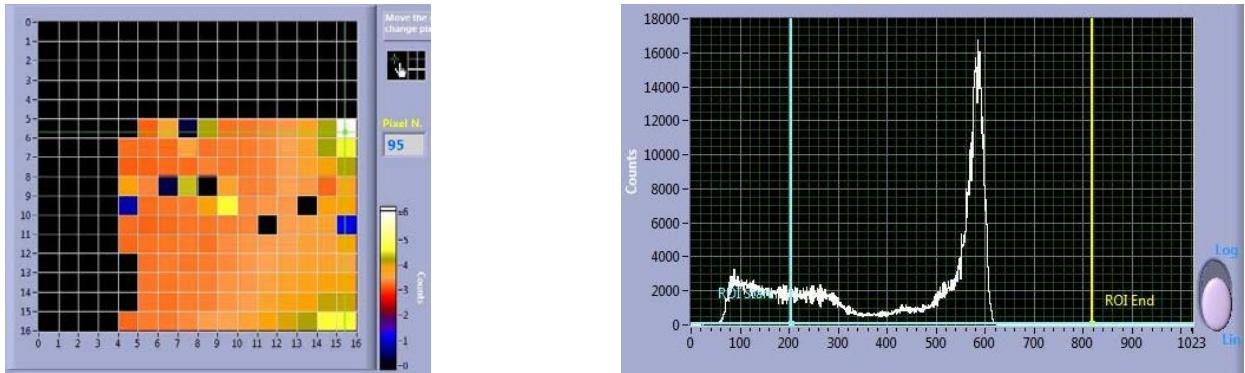
### 3.3 Polarimetry tests

These tests set have the aim to make a confirmation of the polarimetric performance of our pixel CZT detector obtained with the POLCA II experiment (see D4) in February 2007.

The tests will be made using the fine collimated diffracted beam the three available energies centred at on each of the four corner pixel, 85, 95, 245, 255, of the active detector (Figure 7).

The calculation of the modulation Q factor depends on the double events distribution and statistics. In order to get enough statistics on double events these test will require a relative large integration time for each measure. Because typically we expect double event percentage between few percent at the lower beam energy and up to  $\sim 10\%$  at the higher one, we need to collect  $\sim 10^6$  counts to have a least  $10^5$  double events, e.g. less than 0.5 % as statistic error. Taking as average rate 1000 c/s for all the available energies, an integration time of 1000 s for each irradiating configuration was used.

In Appendix C the data file corresponding to this type of measurements (Figure 21) are given with some more details about the used settings.



**Figure 21.** (left) Counts distribution map (in logarithmic false color scale) with the diffracted beam impinging on pixel 95; (right) the pixel 95 energy spectrum for the beam energy of 270 keV (3<sup>rd</sup> armonics).

## 4 Appendix A: LaPOLCA system calibration

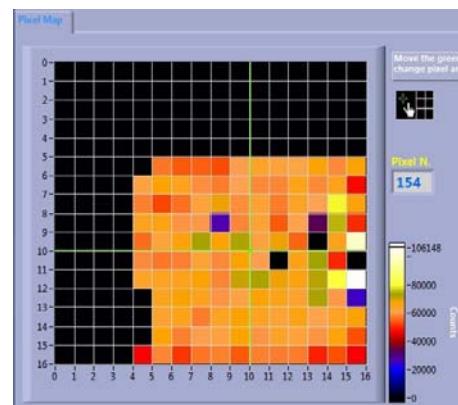
#### 4.1 *Pixel Equalisation and Calibration*

This section summarise the results of the equalisation phase of each POLCA detector pixel chain. The POLCA equalisation has been performed at IASF-BO 27<sup>th</sup> February 2008, using an uncollimated <sup>57</sup>Co source. The 122 keV line has been chosen as reference for the pixel chain equalisation. The analog 16 channels of each board are provided by a trimmer for gain adjustment (from 0.5 to 1.5) with respect to the main amplifier gain. These trimmers are used to equalise the energy response of each detector pixel chain. In each board the trimmer/channel position are numbered from bottom to top: i.e. the lower trimmer/channel correspond to the channel 0, the upper one correspond to channel 15. For the equalisation the ASIC gain have been set to 100 mV/fC and the peaking time to 0.6  $\mu$ s. Using the LaPOLCA acquisition s/w tool we have adjusted the gain of each TAKES electronics channel to equalise the 122 keV peak position around the energy channel  $331 \pm 2$ . In the following pages we report the results of the equalization for each TAKES board (i.e. for each detector pixel).

Board	CZT pixel	Channel	Note	F/3	158	332.2
J/1	222	332	All pixels channel associated to this ASIC are stable.	157 Dead	0	(cut at IASF-BO)
	238	331.5			156	333
	237	331.8			174	332.5
	236	333.8			190	331.8
	221	332.3			206	331.6
	220	331.2			142	330.7
	219	331.7			126	332.2
	235	332.5			141	332.3
	218	331.5			125	330.5
	234	331.4			155	332.3
	217	331.9			154	332.8
	233	332			153 Unstable	223
	232	331.6			171 Dead	0
	216	331.9			170	332.4
	231	330			151	332.3
K/2	215	331.2	All pixels channel associated to this ASIC are stable.	E/4	169	332.8
	173	330			152	332.2
	189	331.7			119	331.8
	172	332.1			168	332.8
	205	332.6			167	332
	188	332.7			140	331.9
	204	333.2			139	332.7
	186	332.7			138	331.3
	187	332.8			122	332.5
	203	331.5			124	330.3
	185	332.5			137	331.6
	184	332.9			121	332.3
	202	331.5			120	332.8
	201	332.3			136 Unstable	185.3
	200	331			136 Dead	1/3/08
	199	331.8			123	330.1
	183	332.9			135	332.3

D/5	223	331		105	330.8	
	255	331.2		100	331.2	
	254	331.6	A/8	229	332.6	
	239	332		213	332.6	
	253	331		244	331.8	
	252	334		197	332.3	
	251	333		181	331.2	Threshold 20ch
	250	332.3		148	331.5	
	249	330.7		180	331	
	248	333.5		165	333	
	247	331.3		164	332.1	
	246	332.8		86	331.5	Threshold 20 ch
	230	333.6		117	331.7	
	214	331.6		87	331.5	
	245	332.3		88	331.4	
	198	332.3		133	331.1	
C/6	159	331.4		101	332.7	
	<b>175 Dead</b>	0		85	332.5	
	191	332				
	207	331.8				
	127	332.1				
	143	331.5				
	111	331.4				
	95	332.5				
	109	331.7				
	93	332.3				
	94	332.2				
	110	331.7				
	108	331.5				
	107	331.4				
	92	332				
	91	331.8				
B/7	182	331.5				
	89	331.1				
	118	332.5				
	103	331.7				
	150	332.5				
	116	331.6				
	102	330.5				
	149	332.1				
	166	331.3				
	132	330.9				
	<b>134</b>	<b>332.4</b>	<b>(cut at ESRF)</b>			
	<b>104</b>	<b>331.8</b>	<b>3/3/08</b>			
	<b>106</b>	<b>330.9</b>				
	<b>90</b>	<b>331.7</b>				

12 pixels associated to ASIC n. 3 are stable and quite uniform in efficiency as demonstrated by the integrated count distribution in the false colour map on the quick look screen grab (Fig. A.1.). Pixel 171, 142 and 156 are dead (D), while pixel channel 158 is unstable (the pixel become noisy time to time).



**Figure A.1**  $^{57}\text{Co}$  count distribution in the false colour map.

The detector unit was calibrated with radioactive open sources ( $^{57}\text{Co}$ ,  $^{241}\text{Am}$ ,  $^{109}\text{Cd}$  e  $^{133}\text{Ba}$ ) at the IASF-Bologna laboratory in order to equalize the energy response of each pixel/channel to within 10%, the spectra and map detector are show in Fig. A.2 on the quick look screen grabs.

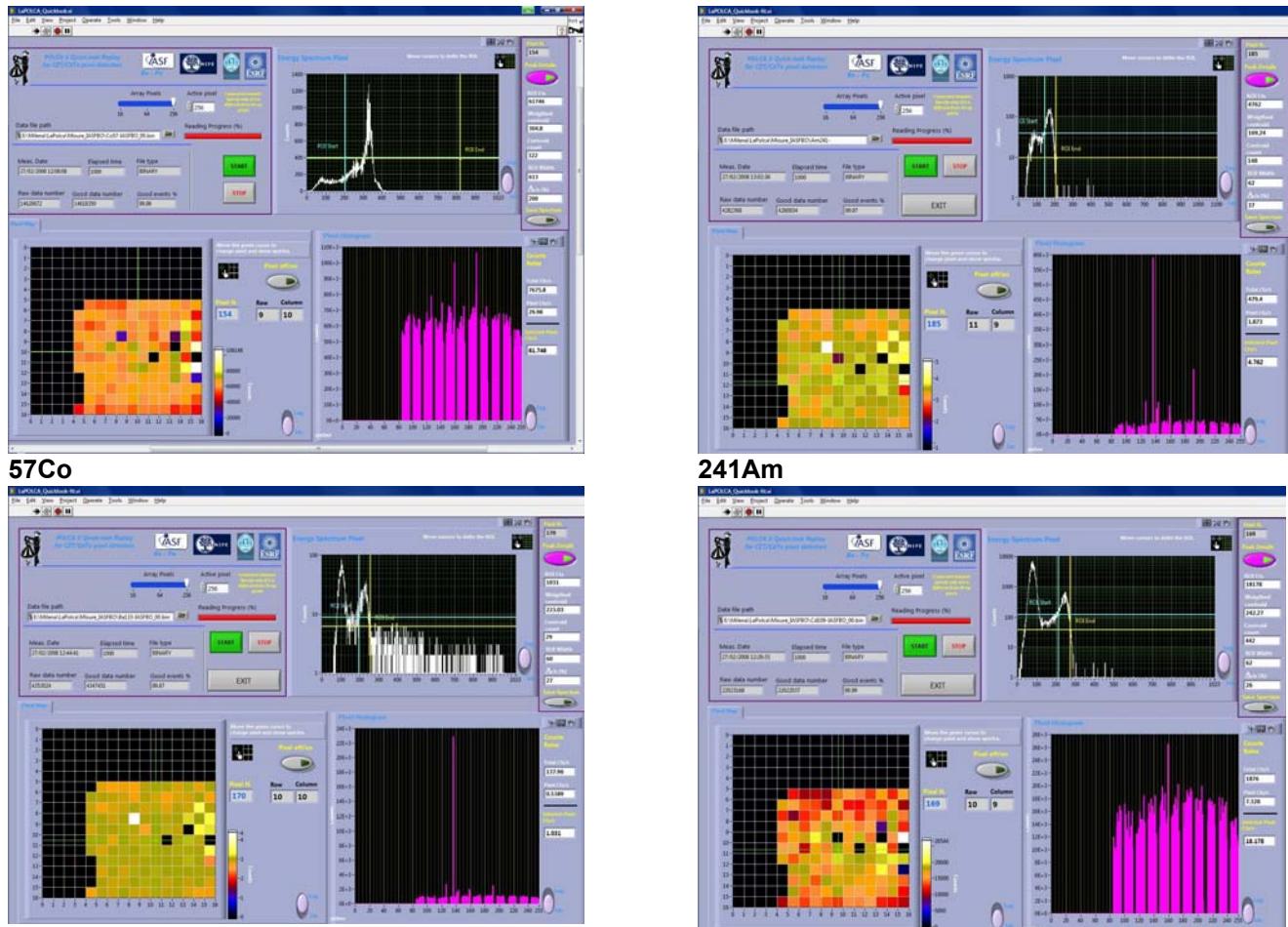


Figure A.2 Spectra and map for the detector unit with radioactive sources.

## 5 Appendix B: Data format

In the following sections are described the new functionality implemented in the TAKES electronics in the ADC board, in order to make the analysis of data (in particular data obtained in scanning mode). This functionality is a relative time counter that gives the temporal distance between an event and the successive one.

### 5.1 The time counter characteristics

The new TAKES feature is a 12 bit binary counter based on a 1.25 MHz clock (that is derived from the internal 20 MHz clock) giving rise to a default time resolution of 0.8  $\mu$ s. This counter uses the low significant 11 bits to record the time interval between one event and the previous one. If the time interval overflow the capacity of the 11 LSB (i.e. 1.6376 ms), the 12<sup>th</sup> MSB (the overflow bit) is set to 1 and is eventually reset to 0 in the subsequent event.

Using the time counter values, all the events can be located in time by summing every subsequent time interval of each event up to the first overflow that interrupt the event series.

The time counter use the 12 MSB of the 32 bits TAKES output word.

The value of the time counter for each hits of a multiple event is set to the same value.

The time resolution of the counter can be changed acting on the clock frequency (Figure B.1 and B.2): i.e. by increasing or decreasing the used clock frequency is possible to increase or decrease, respectively, the time resolution of the counter. Of course this affects the largest time interval that the available 11 bit can describe: e.g. if the clock is set to 5 MHz (4 times more than the default), the time resolution become 0.2  $\mu$ s, while the large time interval between events lows down to  $\sim$ 0.41 ms; if the clock frequency is changed to half of the default one, the time resolution will be 1.6  $\mu$ s, but the largest allowed time interval between events become 3.275 ms.

From the point of view of the data acquisition the time resolution (and therefore the largest time interval between events allowed by the 11 bits) affect the sustainable minimum count rate: i.e. in the default configuration the count rate shall be above the value given by  $1/(1.6376 \text{ ms})$ , i.e.  $> 600$  count/s. Above this input counts rate the time counter will reach overflow condition with low probability given by the Poisson distribution of the arrival times with an average of  $\sim 0.00164$  s.

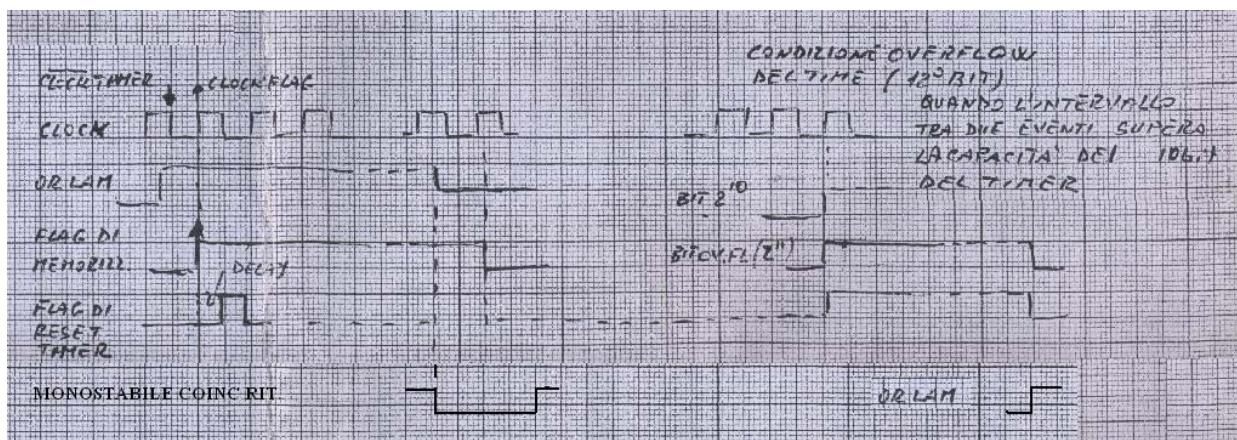
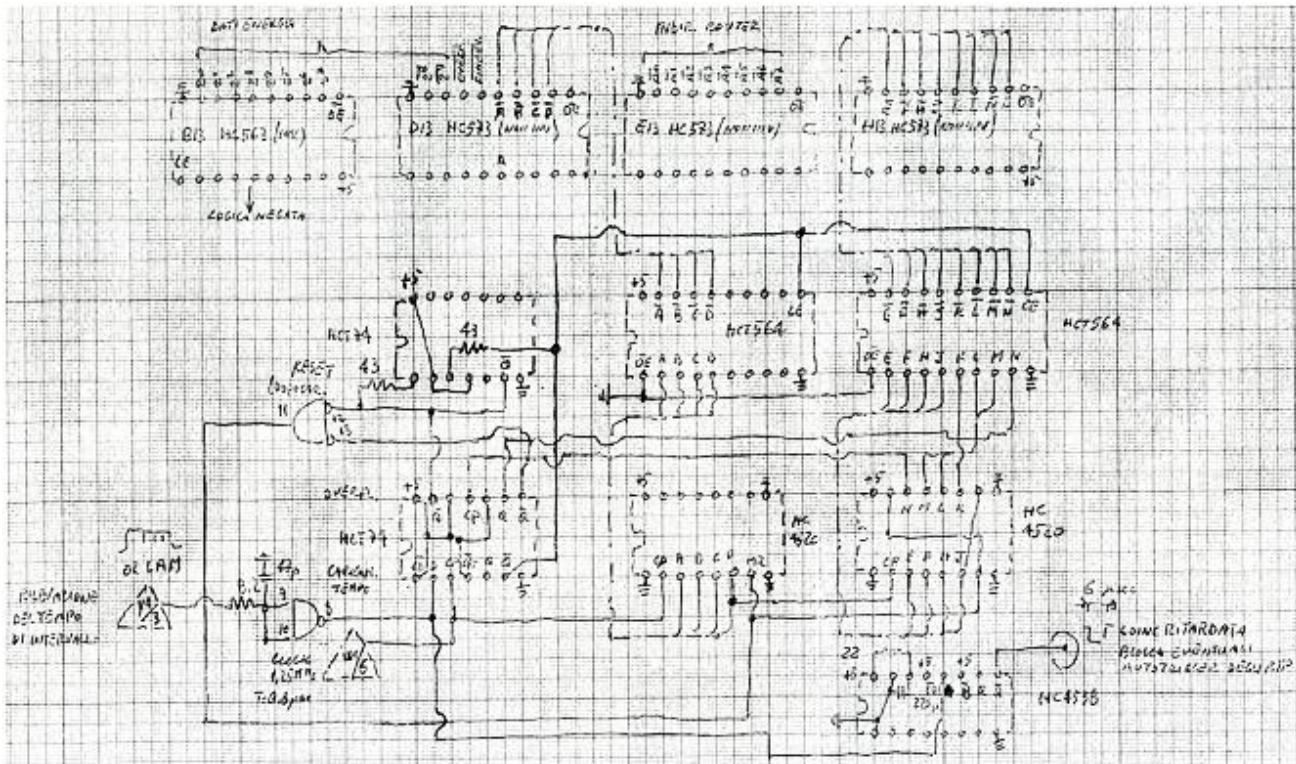


Figure B.1 Schematic of the temporisation of the signals in the time counter.

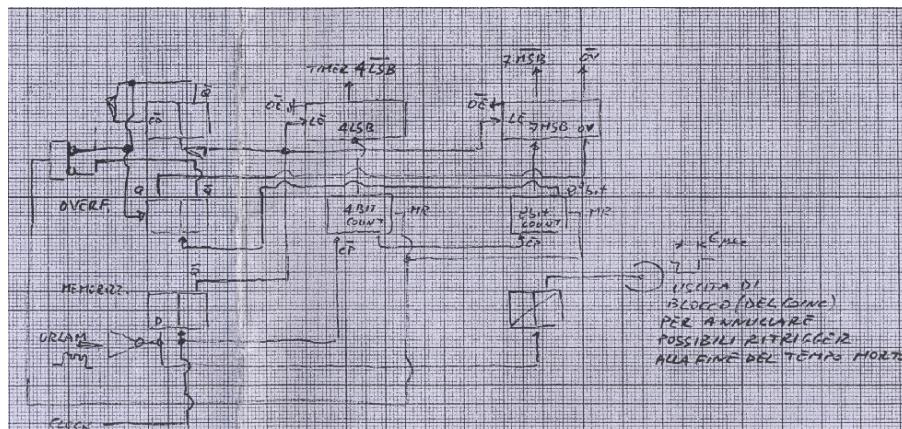


**Figure B.2.** Block diagram of the time counter circuit implemented in the TAKES ADC's board.

## 5.2 Some notes on the use of the delayed coincidence.

The TAKES electronics coincidence logic block (Figure B.3) takes all the input to the low amplitude thresholds until all the parameters of an event (amplitude of each event hit) are converted by ADC's. At the end of this block the RTP circuit for some parameters could be retriggered if at its input an amplitude level above the threshold is founded.

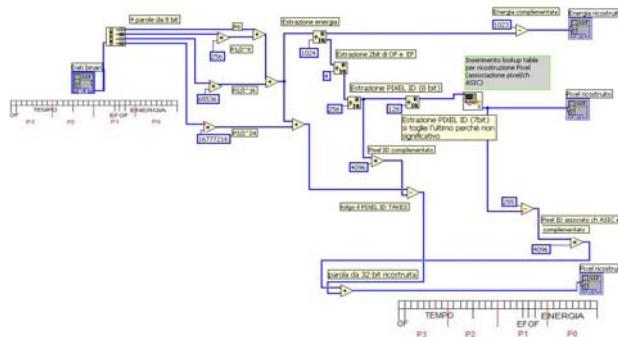
In this case the added delayed coincidence will block the prosecution of the parameters conversions.



**Figure B.3.** Block diagram of the delayed coincidence logic implemented in the TAKES electronics .

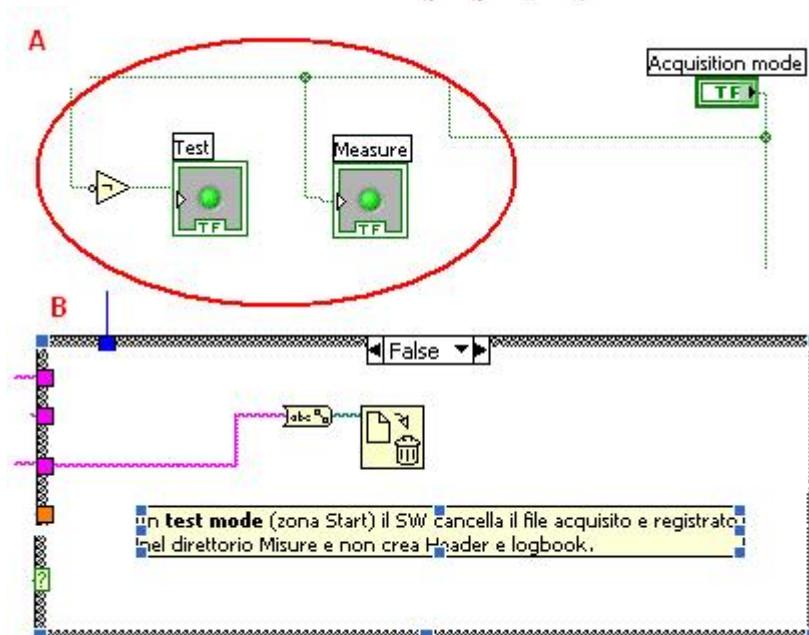
### Data output format

Particular of the new Data decoding subvi.



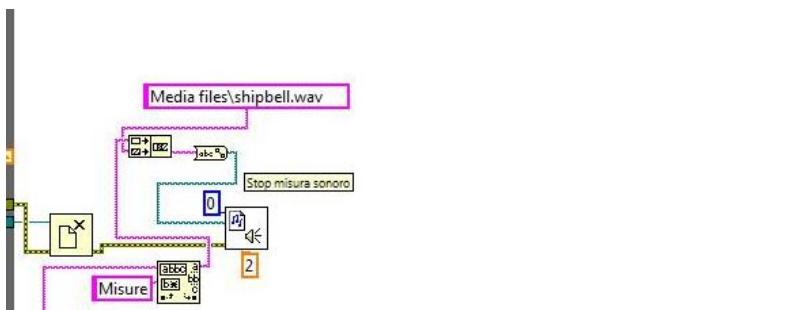
### Test/Acquisition mode switch

- A-** Before starting, the user through the switch shown below sets the acquisition mode.
- B-** At the end of acquisition, the value of the acquisition mode switch decides by a case structure (right) to store or delete the acquire data and to write or not the ancillary files.



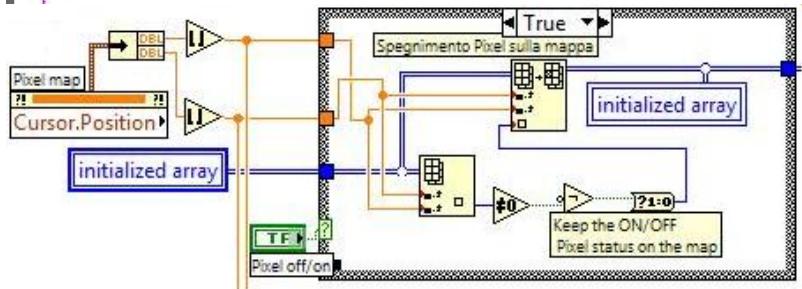
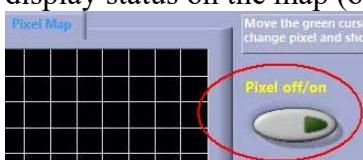
### End of measurement alarm

At the end of the main while loop (stop acquisition) the program runs the selected audio file.



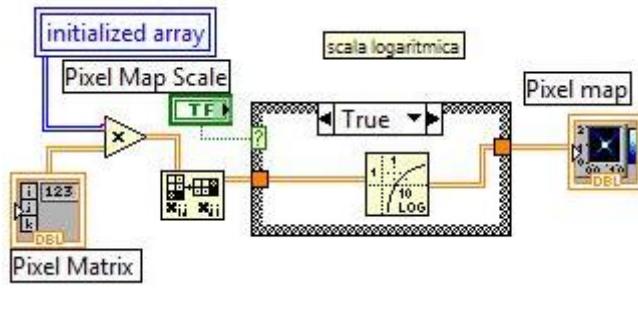
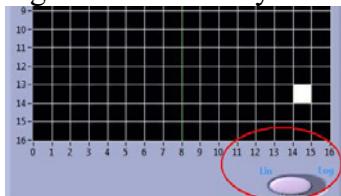
### Pixel on/off switch

In the main while cycle it is possible (case structure) selects with a Boolean button the pixel display status on the map (on/off).



### Colour counts map scale

In the main cycle while it is possible (case structure) selects with a Boolean button the linear or logarithmic intensity scale.



### Pixel neighbours barycentre:

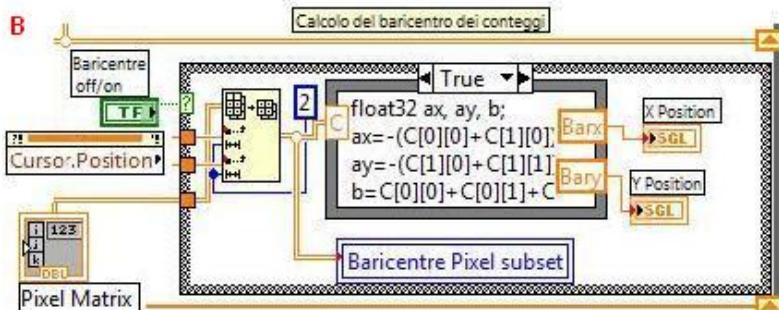
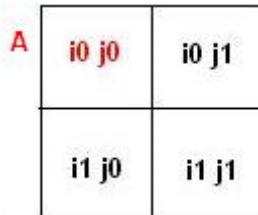
(A) Through the cursor position, centred on one pixel ( $i_0, j_0$ ) on the counts map, the 3 neighbours pixels on the right bottom are selected from the Pixel Matrix array

C( $i, j$ ) (B) Using the counts in each pixel of this sub array (Barycentre Pixel subset) the barycentre is calculated using the relation:

$$\begin{aligned} a_x &= [C(i_0, j_1) + C(i_1, j_1)] - [C(i_0, j_0) + C(i_1, j_0)] \\ a_y &= [C(i_0, j_0) + C(i_0, j_1)] - [C(i_1, j_0) + C(i_1, j_1)] \\ b &= C(i_0, j_0) + C(i_0, j_1) + C(i_1, j_0) + C(i_1, j_1) \end{aligned}$$

$$\text{Barx} = a_x/b;$$

$$\text{Bary} = a_y/b;$$



## 7 Appendix D: LaPOLCA Data files log

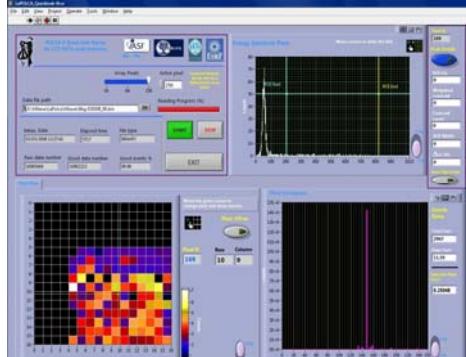
In the following pages the list of the measurements taken during the ESRF Campaign (1<sup>th</sup> March to 4<sup>th</sup> March 2008) is reported. The measurements are classified for type:

- A Background and miscellaneous;**
- B Diffracted and transmitted beam;**
- P Polarimetry;**
- R Rocking curve;**
- L Laue Simulation**
- S Scan;**

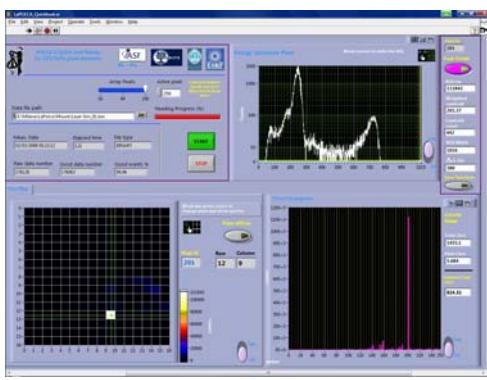
Are also inserted the crab of the quick look display to help to understand the measure characteristics.

The same classify has been used to store the measures by LaPOLCA team. The data are available via ftp on snoopy.iasfbo.inaf.it server in Misure\_Pulite directory.

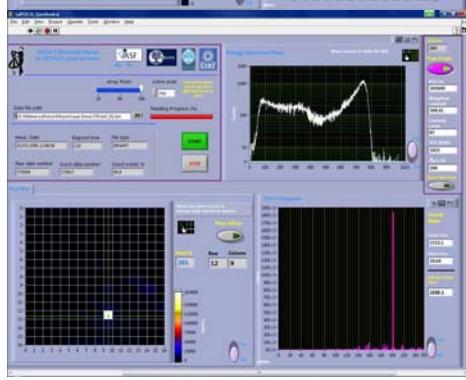
### A: Background distribution.



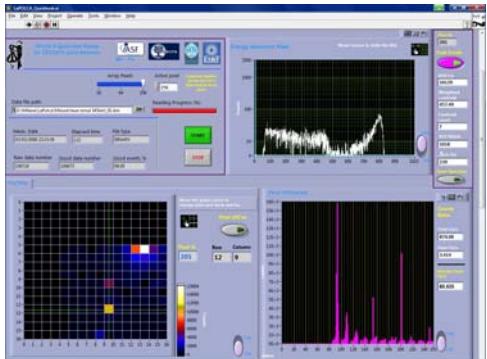
### B: Diffracted and transmitted beam on pixel 201 and 153.



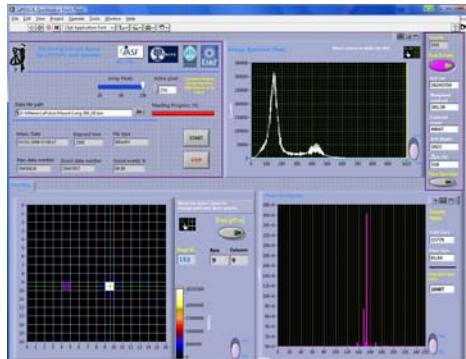
Diffracted 90keV



Diffracted 270 keV

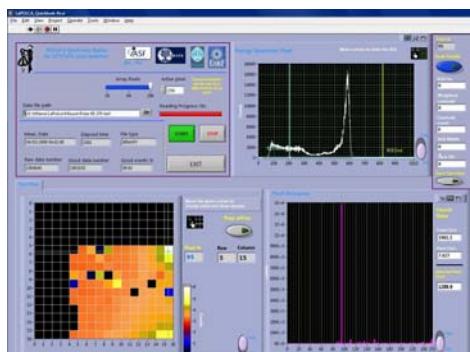


Diffracted 345keV

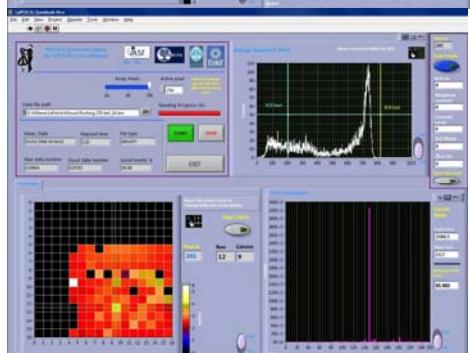


Transmitted Pixel 153

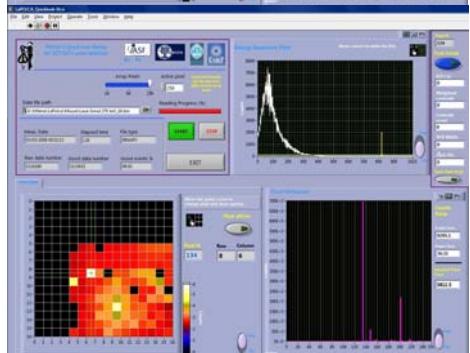
**P:** Polarimetry



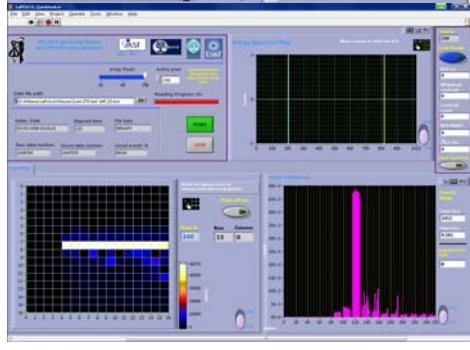
**R:**  
Rocking curve



**L:**  
Laue Simulation



**S:** Scan



A typical measure quick look during the polarimetry tests. The diffracted 270 keV beam impinge on Pixel 95 (top right corner).

One of the measurements during the Cu crystal Rocking evaluation at 270 keV. The diffracted beam impinges on pixel 201.

Laue Simulation at 270 keV. The picture show one of the 16 measure obtained rotating the Cu crystal by step of 22°.5.

The picture shows the quick look during the scan at 270 keV of an entire detector row.

The data log is shown day by day as a list for each linearly polarised radiation energy (~90 keV, 270 keV, and 345 keV). For each measurement are reported: filename, measure notes, measure start time, acquisition time (seconds).

## POLCA II – ESRF Campaign (01/03/- 04/03/2008)

### 01/03/2008 Primo giorno

**A**

E:\Milena\LaPolca\Misure\Fondo010308\_01.bin      Elettronica Multiparametrica  
 Number Read.: 41885 -- Date and Time: 01/03/2008 15:40:02 --  
 Elapsed Time (s): 102  
 Fondo con pixel 136 e 87 tagliati. -Motori accesi. -No fascio

E:\Milena\LaPolca\Misure\source-010308\_00.bin      Elettronica Multiparametrica  
 Number Read.:626688 -- Date and Time: 01/03/2008 16:59:37 -  
 Elapsed Time (s): 151.  
 -Pixel 201 centratura 6 mm Pb tilt 30. -Fascio diretto

E:\Milena\LaPolca\Misure\source-010308\_01.bin      Elettronica Multiparametrica  
 Number Read.: 55330 -- Date and Time: 01/03/2008 17:09:36 --  
 Elapsed Time (s): 111  
 pixel 201 centratura 6 mm Pb tilt 30. -Fascio diretto.

E:\Milena\LaPolca\Misure\bkg-010308\_00.bin      Elettronica Multiparametrica  
 Number Read.:1332060 - Date and Time: 01/03/2008 17:48:46 -  
 Elapsed Time (s): 742  
 shutter on. -Pb in front of the detector

E:\Milena\LaPolca\Misure\bkg-010308\_01.bin      Elettronica Multiparametrica  
 Number Read.: 71151 -- Date and Time: 01/03/2008 18:01:16 --  
 Elapsed Time (s): 187  
 shutter on. - Pb in front of the detector

**B**  
 E:\Milena\LaPolca\Misure\diffratto-010308\_00.bin      Elettronica Multiparametrica  
 Number Read.:643242 - Date and Time: 01/03/2008 18:09:13 --  
 Elapsed Time (s): 724  
 6 mm Pb shield no angle

E:\Milena\LaPolca\Misure\diffratto-010308Pixel202\_00.bin.Elett.  
 Multiparametrica  
 Number Read.:6187712 - Date and Time: 01/03/2008 18:51:39 -  
 Elapsed Time (s): 6031  
 6 mm Pb shield no angle. -Pixel 202 con cristallo con phi 287.

E:\Milena\LaPolca\Misure\diffratto-010308Pixel201\_00.bin -Elett.  
 Multiparametrica  
 Number Read.:1461608 - Date and Time: 01/03/2008 21:59:41 -  
 Elapsed Time (s): 651  
 5 mm Pb equivalente. - Diffratto a 270 keV da piani 111 del Cu. -  
 Centrato su Pix 201

E:\Milena\LaPolca\Misure\trasmesso-010308Pixel201\_00.bin -Elett.  
 Multiparametrica  
 Number Read.:9408512 Date and Time: 01/03/2008 22:17:43 -  
 Elapsed Time (s): 1040  
 5 mm Pb equivalente. Trasmesso. Centrato su Pix 202

**R**  
 E:\Milena\LaPolca\Misure\rocking-030208\_00.bin      Elettronica Multiparametrica  
 Number Read.: 34816 -- Date and Time: 01/03/2008 23:05:38 --  
 Elapsed Time (s): 26  
 25 s integration. - phi=-0.8 a -1.2 con passi da 0.01. - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_01.bin      Elettronica Multiparametrica

Number Read.: 24290 -- Date and Time: 01/03/2008 23:08:17 --  
 Elapsed Time (s): 52  
 25 s integration. - phi=-0.8 a -1.2 con passi da 0.025. - Pixel 200.

E:\Milena\LaPolca\Misure\rocking-030208\_02.bin      Elettronica Multiparametrica  
 Number Read.: 24932 -- Date and Time: 01/03/2008 23:09:37 --  
 Elapsed Time (s): 52  
 25 s integration. -phi=-0.8 a -1.2 con passi da 0.025. -Pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_03.bin      Elettronica Multiparametrica  
 Number Read.: 24577 -- Date and Time: 01/03/2008 23:10:44 --  
 Elapsed Time (s): 52  
 25 s integration. -phi=-0.8 a -1.2 con passi da 0.025. -pixel 200.

E:\Milena\LaPolca\Misure\rocking-030208\_04.bin      Elettronica Multiparametrica  
 Number Read.: 24918 -- Date and Time: 01/03/2008 23:11:49 --  
 Elapsed Time (s): 51  
 25 s integration. -phi=-0.8 a -1.2 con passi da 0.025. -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_05.bin      Elettronica Multiparametrica  
 Number Read.: 25169 -- Date and Time: 01/03/2008 23:12:52 --  
 Elapsed Time (s): 52  
 25 s integration. -phi=-0.8 a -1.2 con passi da 0.025. -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_06.bin      Elettronica Multiparametrica  
 Number Read.: 26174 -- Date and Time: 01/03/2008 23:13:56 --  
 Elapsed Time (s): 52  
 25 s integration. -phi=-0.8 a -1.2 con passi da 0.025. -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_07.bin      Elettronica Multiparametrica  
 Number Read.: 27682 -- Date and Time: 01/03/2008 23:14:58 --  
 Elapsed Time (s): 52  
 25 s integration. - phi=-0.8 a -1.2 con passi da 0.025. -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_08.bin      Elettronica Multiparametrica  
 Number Read.: 28117 -- Date and Time: 01/03/2008 23:16:00 --  
 Elapsed Time (s): 52  
 25 s integration - phi=-0.8 a -1.2 con passi da 0.025 -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_09.bin      Elettronica Multiparametrica  
 Number Read.: 30770 -- Date and Time: 01/03/2008 23:17:02 --  
 Elapsed Time (s): 52  
 25 s integration - phi=-0.8 a -1.2 con passi da 0.025 - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_10.bin      Elettronica Multiparametrica  
 Number Read.: 56320 -- Date and Time: 01/03/2008 23:18:35 --  
 Elapsed Time (s): 51  
 25 s integration - phi=-1.0 a -1.2 con passi da 0.01 -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_11.bin      Elettronica Multiparametrica  
 Number Read.: 77824 -- Date and Time: 01/03/2008 23:19:42 --  
 Elapsed Time (s): 51  
 25 s integration - phi=-1.0 a -1.2 con passi da 0.01 - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_12.bin      Elettronica Multiparametrica  
 Number Read.: 73728 -- Date and Time: 01/03/2008 23:20:43 --  
 Elapsed Time (s): 51  
 25 s integration - phi=-1.0 a -1.2 con passi da 0.01 - pixel 200



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E:\Milena\LaPolca\Misure\rocking-030208\_13.bin Elettronica  
Multiparametrica  
Number Read.: 72704 -- Date and Time: 01/03/2008 23:21:45 --  
Elapsed Time (s): 51  
25 s integration - phi=-1.0 a -1.2 con passi da 0.01 -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_14.bin Elettronica  
Multiparametrica  
Number Read.: 83968 -- Date and Time: 01/03/2008 23:22:50 --  
Elapsed Time (s): 51  
25 s integration - phi=-1.0 a -1.2 con passi da 0.01 - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_15.bin Elettronica  
Multiparametrica  
Number Read.: 84992 -- Date and Time: 01/03/2008 23:23:51 --  
Elapsed Time (s): 51  
25 s integration -phi=-1.0 a -1.2 con passi da 0.01 -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_16.bin Elettronica  
Multiparametrica  
Number Read.: 48128 -- Date and Time: 01/03/2008 23:24:55 --  
Elapsed Time (s): 52  
25 s integration - phi=-1.0 a -1.2 con passi da 0.01 -pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_17.bin Elettronica  
Multiparametrica  
Number Read.: 36138 -- Date and Time: 01/03/2008 23:26:01 --  
Elapsed Time (s): 52  
25 s integration - phi=-1.0 a -1.2 con passi da 0.01 - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_18.bin Elettronica  
Multiparametrica  
Number Read.: 35450 -- Date and Time: 01/03/2008 23:27:03 --  
Elapsed Time (s): 52  
25 s integration - phi=-1.0 a -1.2 con passi da 0.01 - pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_19.bin Elettronica  
Multiparametrica  
Number Read.: 32814 -- Date and Time: 01/03/2008 23:28:25 --  
Elapsed Time (s): 52  
25 s integration ; phi=-1.0 a -1.2 con passi da 0.01; pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_20.bin Elettronica  
Multiparametrica  
Number Read.: 25999 -- Date and Time: 01/03/2008 23:29:25 --  
Elapsed Time (s): 52  
25 s integration; phi=-1.0 a -1.2 con passi da 0.01; pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_21.bin Elettronica  
Multiparametrica  
Number Read.: 24478 -- Date and Time: 01/03/2008 23:30:26 --  
Elapsed Time (s): 52  
25 s integration; phi=-1.0 a -1.2 con passi da 0.01; pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_22.bin Elettronica  
Multiparametrica  
Number Read.: 23756 -- Date and Time: 01/03/2008 23:31:28 --  
Elapsed Time (s): 51  
25 s integration; phi=-1.0 a -1.2 con passi da 0.01; pixel 200

E:\Milena\LaPolca\Misure\rocking-030208\_23.bin Elettronica  
Multiparametrica  
Number Read.: 24039 -- Date and Time: 01/03/2008 23:32:30 --  
Elapsed Time (s): 51  
25 s integration; phi=-1.0 a -1.2 con passi da 0.01; pixel 200

**02/03/2008 Secondo giorno**

**S**  
E:\Milena\LaPolca\Misure\scan-020308-row\_03.bin Elettronica  
Multiparametrica  
Number Read.:1739507 -- Date and Time: 02/03/2008 03:25:03 --  
Elapsed Time (s): 311 - **dopo modifica look-up per scambio pixel**

E:\Milena\LaPolca\Misure\scan-020308-row\_06.bin Elettronica  
Multiparametrica  
Number Read.:2106359 -- Date and Time: 02/03/2008 03:33:51 --  
Elapsed Time (s): 318; dopo modifica look-up per scambio pixel;  
row-2

E:\Milena\LaPolca\Misure\scan-020308-row\_07.bin Elettronica  
Multiparametrica  
Number Read.:2149509 -- Date and Time: 02/03/2008 03:39:20 --  
Elapsed Time (s): 318; dopo modifica look-up per scambio pixel;  
row-3

E:\Milena\LaPolca\Misure\scan-020308-row\_08.bin Elettronica  
Multiparametrica  
Number Read.:2075966 -- Date and Time: 02/03/2008 03:44:50 --  
Elapsed Time (s): 316; dopo modifica look-up per scambio pixel;  
row-4

E:\Milena\LaPolca\Misure\scan-020308-row\_09.bin Elettronica  
Multiparametrica  
Number Read.:2132391 -- Date and Time: 02/03/2008 03:50:18 --  
Elapsed Time (s): 307; dopo modifica look-up per scambio pixel;  
row-5

E:\Milena\LaPolca\Misure\scan-020308-row\_10.bin Elettronica  
Multiparametrica  
Number Read.:2130264 -- Date and Time: 02/03/2008 03:55:40 --  
Elapsed Time (s): 310; dopo modifica look-up per scambio pixel;  
row-6

E:\Milena\LaPolca\Misure\scan-020308-row\_11.bin Elettronica  
Multiparametrica  
Number Read.:2172211 -- Date and Time: 02/03/2008 04:01:03 --  
Elapsed Time (s): 305; dopo modifica look-up per scambio pixel;  
row-7

E:\Milena\LaPolca\Misure\scan-020308-row\_12.bin Elettronica  
Multiparametrica  
Number Read.:2014912 -- Date and Time: 02/03/2008 04:06:19 --  
Elapsed Time (s): 293; dopo modifica look-up per scambio pixel;  
row-8

E:\Milena\LaPolca\Misure\scan-020308-row\_13.bin Elettronica  
Multiparametrica  
Number Read.:2064061 -- Date and Time: 02/03/2008 04:12:18 --  
Elapsed Time (s): 342; dopo modifica look-up per scambio pixel;  
row-9

E:\Milena\LaPolca\Misure\scan-020308-row\_14.bin Elettronica  
Multiparametrica  
Number Read.:1968406 -- Date and Time: 02/03/2008 04:18:15 --  
Elapsed Time (s): 304; dopo modifica look-up per scambio pixel;  
row-9

E:\Milena\LaPolca\Misure\scan-020308-row\_15.bin Elettronica  
Multiparametrica  
Number Read.:1974654 -- Date and Time: 02/03/2008 04:23:45 --  
Elapsed Time (s): 319; dopo modifica look-up per scambio pixel;  
row-10

E:\Milena\LaPolca\Misure\scan-020308-row\_16.bin Elettronica  
Multiparametrica  
Number Read.:1981803 -- Date and Time: 02/03/2008 04:29:16 --  
Elapsed Time (s): 311; dopo modifica look-up per scambio pixel;  
row-11

E:\Milena\LaPolca\Misure\scan-020308-row\_18.bin Elettronica  
Multiparametrica



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Number Read.:254976 -- Date and Time: 02/03/2008 04:55:50 --  
Elapsed Time (s): 170; Chi=0; Phi=-1.02; dey=-41.35; spinz=-  
179.125

**L**  
E:\Milena\LaPolca\Misure\Laue-Sim\_00.bin Elettronica  
Multiparametrica  
Number Read.:177152 -- Date and Time: 02/03/2008 04:59:09 --  
Elapsed Time (s): 121; Chi=0; Phi=-1.02; dey=-41.35; spinz=-  
179.125; Pico2=-17.8

E:\Milena\LaPolca\Misure\Laue-Sim\_01.bin Elettronica  
Multiparametrica  
Number Read.:176128 -- Date and Time: 02/03/2008 05:22:12 --  
Elapsed Time (s): 121; Chi=22.5; Phi=-0.95; dey=-6.65; spinz=-  
171.625; Pico2=-17.8

E:\Milena\LaPolca\Misure\Laue-Sim\_02.bin Elettronica  
Multiparametrica  
Number Read.:169984 -- Date and Time: 02/03/2008 05:39:40 --  
Elapsed Time (s): 121; Chi=45; Phi=-0.85; dey=20.85; spinz=-  
151.125; Pico2=-17.7

E:\Milena\LaPolca\Misure\Laue-Sim\_03.bin Elettronica  
Multiparametrica  
Number Read.:173056 -- Date and Time: 02/03/2008 05:51:45 --  
Elapsed Time (s): 121; Chi=72.5; Phi=-0.8; dey=41.35; spinz=-  
113.625; Pico2=-18.0

E:\Milena\LaPolca\Misure\Laue-Sim\_04.bin Elettronica  
Multiparametrica  
Number Read.:177152 -- Date and Time: 02/03/2008 06:10:06 --  
Elapsed Time (s): 121; Chi=90; Phi=-0.78; dey=45.05; spinz=-87.4;  
Pico2=-17.9

E:\Milena\LaPolca\Misure\Laue-Sim\_05.bin Elettronica  
Multiparametrica  
Number Read.:167936 -- Date and Time: 02/03/2008 06:35:40 --  
Elapsed Time (s): 121; Chi=67.5; Phi=-0.8; dey=39.8; spinz=-121.5;  
Pico2=-173.65

E:\Milena\LaPolca\Misure\Laue-Sim\_06.bin Elettronica  
Multiparametrica  
Number Read.:183296 -- Date and Time: 02/03/2008 07:15:43 --  
Elapsed Time (s): 121; Chi=112.5; Phi=-0.8; dey=37.55; spinz=-  
53.1; Pico2=-17.5

E:\Milena\LaPolca\Misure\Laue-Sim\_08.bin Elettronica  
Multiparametrica  
Number Read.:180224 -- Date and Time: 02/03/2008 07:33:25 --  
Elapsed Time (s): 121; Chi=135; Phi=-0.9; dey=17.45; spinz=-  
25.1; Pico2=-17.9

E:\Milena\LaPolca\Misure\Laue-Sim\_09.bin Elettronica  
Multiparametrica  
Number Read.:159744 -- Date and Time: 02/03/2008 08:24:06 --  
Elapsed Time (s): 121; Chi=157.5; Phi=-0.01; dey=-12.05; spinz=-  
6.6; Pico2=-17.9

E:\Milena\LaPolca\Misure\Laue-Sim\_10.bin Elettronica  
Multiparametrica  
Number Read.:177152 -- Date and Time: 02/03/2008 08:45:16 --  
Elapsed Time (s): 121; Chi=180.0; Phi=-1.07; dey=-46.55; spinz=-  
1.1; Pico2=-17.92

E:\Milena\LaPolca\Misure\Laue-Sim\_11.bin Elettronica  
Multiparametrica  
Number Read.:187392 -- Date and Time: 02/03/2008 11:12:00 --  
Elapsed Time (s): 121; chi=180.0; phi=2.8; dey=-41.15; sinz=-178.9;  
pico2=-17.89; 1st Measure after problem

E:\Milena\LaPolca\Misure\Laue-Sim\_12.bin Elettronica  
Multiparametrica

Number Read.:167936 -- Date and Time: 02/03/2008 11:26:51 --  
Elapsed Time (s): 121; chi=157.5; phi=2.88; dey=-75.55; spinz=-  
172.9; pico2=-18.3

E:\Milena\LaPolca\Misure\Laue-Sim\_13.bin Elettronica  
Multiparametrica  
Number Read.:178176 -- Date and Time: 02/03/2008 11:43:36 --  
Elapsed Time (s): 121; chi=135.0; phi=3.01; dey=-104.75; spinz=-  
154.9; pico2=-18.34

E:\Milena\LaPolca\Misure\Laue-Sim\_14.bin Elettronica  
Multiparametrica  
Number Read.:175104 -- Date and Time: 02/03/2008 11:53:50 --  
Elapsed Time (s): 121; chi=112.5; phi=3.06; dey=-124.75; spinz=-  
127.4; pico2=-17.8

E:\Milena\LaPolca\Misure\Laue-Sim\_18.bin Elettronica  
Multiparametrica  
Number Read.:52453 -- Date and Time: 02/03/2008 11:58:42 --  
Elapsed Time (s): 121  
chi=112.5; phi=3.06; dey=-124.75; spinz=-127.4; pico2=-17.8

E:\Milena\LaPolca\Misure\Laue-Sim\_15.bin Elettronica  
Multiparametrica  
Number Read.:192512 -- Date and Time: 02/03/2008 12:13:18 --  
Elapsed Time (s): 121; chi=90.0; phi=3.11; dey=-132.45; spinz=-  
92.4; pico2=-18.2

E:\Milena\LaPolca\Misure\Laue-Sim\_16.bin Elettronica  
Multiparametrica  
Number Read.:195584 -- Date and Time: 02/03/2008 12:30:01 --  
Elapsed Time (s): 121; chi=67.5; phi=3.11; dey=-127.15; spinz=-  
58.1; pico2=-17.8

E:\Milena\LaPolca\Misure\Laue-Sim\_17.bin Elettronica  
Multiparametrica  
Number Read.:1100800 -- Date and Time: 02/03/2008 15:08:36 --  
Elapsed Time (s): 120; chi=45.0; phi=3.06; dey=-108.65; spinz=-  
28.6; pico2=-18.9

E:\Milena\LaPolca\Misure\Laue-Sim\_18.bin Elettronica  
Multiparametrica  
Number Read.:359424 -- Date and Time: 02/03/2008 15:19:16 --  
Elapsed Time (s): 121; chi=22.5; phi=2.96; dey=-80.15; spinz=-8.6;  
pico2=-19.0

E:\Milena\LaPolca\Misure\Laue-Sim\_19.bin Elettronica  
Multiparametrica  
Number Read.:392192 -- Date and Time: 02/03/2008 15:30:17 --  
Elapsed Time (s): 120; chi=0.0; phi=2.86; dey=-46.45; spinz=-1.1;  
pico2=-18.1

**90 keV**

**S**  
E:\Milena\LaPolca\Misure\Scan 2 Row 00\_00.bin; Elett Multip;  
Number Read.:1844431 -- Date and Time: 02/03/2008 16:04:09 --  
Elapsed Time (s): 321; Cut pixel 171; Row 0

E:\Milena\LaPolca\Misure\Scan 2 Row 01\_00.bin; Elett Multip;  
Number Read.:2333018 -- Date and Time: 02/03/2008 16:11:20 --  
Elapsed Time (s): 320; **Cut pixel 171**; Row 1

E:\Milena\LaPolca\Misure\Scan 2 Row 02\_00.bin; Elett Multip;  
Number Read.:2644035 -- Date and Time: 02/03/2008 16:17:59 --  
Elapsed Time (s): 312; Cut pixel 171; Row 2

E:\Milena\LaPolca\Misure\Scan 2 Row 03\_00.bin; Elettronica  
Multiparametrica: Number Read.:1963443 -- Date and Time:  
02/03/2008 16:24:00 -- Elapsed Time (s): 308; Cut pixel 171; Row 3



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E:\Milena\LaPolca\Misure\Scan 2 Row 0\_01.bin; Elettronica Multiparametrica; Number Read.:2523106 -- Date and Time: 02/03/2008 16:30:19 -- Elapsed Time (s): 308; Cut pixel 171; Row 4

E:\Milena\LaPolca\Misure\Scan 2 Row 5\_01.bin; Elettronica Multiparametrica; Number Read.:2195409 -- Date and Time: 02/03/2008 16:35:59 -- Elapsed Time (s): 321; Cut pixel 171; Row 5

E:\Milena\LaPolca\Misure\Scan 2 Row 6\_00.bin; Elettronica Multiparametrica; Number Read.:2561915 -- Date and Time: 02/03/2008 16:42:28 -- Elapsed Time (s): 313; Cut pixel 171; Row 6

E:\Milena\LaPolca\Misure\Scan 2 Row 7\_00.bin; Elettronica Multiparametrica; Number Read.:2809378 -- Date and Time: 02/03/2008 16:47:55 -- Elapsed Time (s): 310; Cut pixel 171; Row 7

E:\Milena\LaPolca\Misure\Scan 2 Row 8\_00.bin; Elettronica Multiparametrica; Number Read.:3002368 -- Date and Time: 02/03/2008 16:53:19 -- Elapsed Time (s): 309; Cut pixel 171; Row 8

E:\Milena\LaPolca\Misure\Scan 2 Row 9\_00.bin; Elettronica Multiparametrica; Number Read.:2174802 -- Date and Time: 02/03/2008 16:58:42 -- Elapsed Time (s): 305; Cut pixel 171; Row 9

E:\Milena\LaPolca\Misure\Scan 2 Row 10\_00.bin; Elettronica Multiparametrica; Number Read.:2158299 -Date and Time: 02/03/2008 17:04:06 -- Elapsed Time (s): 304; Cut pixel 171; Row 10

E:\Milena\LaPolca\Misure\Scan 90keV diffratto\_01.bin  
Elettronica Multiparametrica  
Number Read.:25387087 -- Date and Time: 02/03/2008 19:01:05 -- Elapsed Time (s): 3601; 5 mm Pb; row 1; Scan totale di 11 righe; DT su pixel 20 s

**P**  
E:\Milena\LaPolca\Misure\Polar 245 90keV diffratto\_00.bin  
Elettronica Multiparametrica; Number Read.:7247872 -- Date and Time: 02/03/2008 20:39:09 -- Elapsed Time (s): 1000; 5 mm Pb; Polarizzazione Pixel 245

**E 270 keV**

**R**  
E:\Milena\LaPolca\Misure\Rocking 020308\_01.bin Elettronica Multiparametrica  
Number Read.:120832 -- Date and Time: 02/03/2008 21:28:31 -- Elapsed Time (s): 20; Pixel 201

E:\Milena\LaPolca\Misure\Rocking 020308\_03.bin Elettronica Multiparametrica  
Number Read.: 89088 -- Date and Time: 02/03/2008 21:29:18 -- Elapsed Time (s): 20; Pixel 201

E:\Milena\LaPolca\Misure\Rocking 020308\_04.bin Elettronica Multiparametrica  
Number Read.: 84992 -- Date and Time: 02/03/2008 21:29:44 -- Elapsed Time (s): 20; Pixel 201

E:\Milena\LaPolca\Misure\Rocking 020308\_05.bin Elettronica Multiparametrica  
Number Read.:125952 -- Date and Time: 02/03/2008 21:30:14 -- Elapsed Time (s): 20; Pixel 201

E:\Milena\LaPolca\Misure\Rocking 020308\_06.bin Elettronica Multiparametrica  
Number Read.: 56320 -- Date and Time: 02/03/2008 21:30:50 -- Elapsed Time (s): 21; Pixel 201

E:\Milena\LaPolca\Misure\Rocking 020308\_2\_00.bin; Elett Multip;  
Number Read.: 89088 -- Date and Time: 02/03/2008 21:36:23 -- Elapsed Time (s): 20; Dall'altra parte, phi= 1.54

E:\Milena\LaPolca\Misure\Rocking 020308\_2\_03.bin; Elettronica Multiparametrica; Number Read.: 80896 -- Date and Time: 02/03/2008 21:37:19 -- Elapsed Time (s): 20; Dall'altra parte, phi= 1.53

E:\Milena\LaPolca\Misure\Rocking 020308\_3\_00.bin; Elettronica Multiparametrica; Number Read.: 82944 -- Date and Time: 02/03/2008 21:58:01 -- Elapsed Time (s): 20; phi=1.53

E:\Milena\LaPolca\Misure\Rocking 020308-4\_00.bin Elettronica Multiparametrica  
Number Read.: 30720 -- Date and Time: 02/03/2008 21:59:39 -- Elapsed Time (s): 21; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_01.bin Elettronica Multiparametrica  
Number Read.: 75776 -- Date and Time: 02/03/2008 22:01:02 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_02.bin; Elettronica Multiparametrica  
Number Read.: 70656 -- Date and Time: 02/03/2008 22:01:45 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_03.bin Elettronica Multiparametrica  
Number Read.: 76800 -- Date and Time: 02/03/2008 22:02:28 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_04.bin Elettronica Multiparametrica  
Number Read.: 79872 -- Date and Time: 02/03/2008 22:02:56 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_06.bin Elettronica Multiparametrica  
Number Read.: 82944 -- Date and Time: 02/03/2008 22:03:31 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_07.bin Elettronica Multiparametrica  
Number Read.: 65536 -- Date and Time: 02/03/2008 22:04:00 -- Elapsed Time (s): 20; Scan da phi= 1.59

E:\Milena\LaPolca\Misure\Rocking 020308-4\_08.bin; Elettronica Multiparametrica; Number Read.: 32768 -- Date and Time: 02/03/2008 22:04:30 -- Elapsed Time (s): 21; Scan da phi= 1.59

**L**  
E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_00.bin; Elettronica Multiparametrica  
Number Read.:635904 -- Date and Time: 02/03/2008 22:34:05 -- Elapsed Time (s): 120; Chi=0; Phi=1.55; dey=-44.75; spinz=-60.35; Pico2=-15.4; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_01.bin; Elettronica Multiparametrica; Number Read.:579584 -- Date and Time: 02/03/2008 22:46:56 -- Elapsed Time (s): 120; Chi=22.5; Phi=1.67; dey=-56; spinz=-62.85; Pico2=-14.3; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_02.bin; Elettronica Multiparametrica  
Number Read.:637952 -- Date and Time: 02/03/2008 22:57:09 -- Elapsed Time (s): 120; Chi=45; Phi=1.75; dey=-65.25; spinz=-69.65; Pico2=-14.6; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_03.bin; Elettronica Multiparametrica  
Number Read.:521216 -- Date and Time: 02/03/2008 23:06:53 -- Elapsed Time (s): 120; Chi=67.5; Phi=1.8; dey=-71.5; spinz=-79.4; Pico2=-14.5; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_04.bin; Elettronica Multiparametrica  
Number Read.:491520 -- Date and Time: 02/03/2008 23:14:31 --  
Elapsed Time (s): 120; Chi=90; Phi=1.8; dey=-73.5; spinz=-90.65;  
Pico2=-14.4; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_05.bin; Elettronica Multiparametrica  
Number Read.:377856 -- Date and Time: 02/03/2008 23:21:25 -- Elapsed Time (s): 121; Chi=112.5; Phi=1.8; dey=-71; spinz=-102.15; Pico2=-14.2; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_06.bin; Elettronica Multiparametrica  
Number Read.:572416 -- Date and Time: 02/03/2008 23:27:40 -- Elapsed Time (s): 120; Chi=1355; Phi=1.7; dey=-66.4; spinz=-111.65; Pico2=-14.7; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_07.bin  
Elettronica Multiparametrica  
Number Read.:517120 -- Date and Time: 02/03/2008 23:42:05 --  
Elapsed Time (s): 120; Chi=157.5; Phi=1.6; dey=-54.15; spinz=-117.65; Pico2=-14.3; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_08.bin  
Elettronica Multiparametrica  
Number Read.:328704 -- Date and Time: 02/03/2008 23:50:34 --  
Elapsed Time (s): 120; Chi=180; Phi=1.52; dey=-42.9; spinz=-119.65; Pico2=-14.1; E= 270 keV

### 03/03/2008 Terzo giorno

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_09.bin  
Elettronica Multiparametrica  
Number Read.:668672 -- Date and Time: 03/03/2008 00:01:50 --  
Elapsed Time (s): 120; Chi=180; Phi=0.2; dey=-44.65; spinz=-60.15;  
Pico2=-14.4; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_10.bin  
Elettronica Multiparametrica  
Number Read.:718848 -- Date and Time: 03/03/2008 00:07:06 --  
Elapsed Time (s): 120; Chi=157.5; Phi=0.3; dey=-33.45; spinz=-62.15; Pico2=-14.5; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_11.bin  
Elettronica Multiparametrica  
Number Read.:412672 -- Date and Time: 03/03/2008 00:12:21 --  
Elapsed Time (s): 120; Chi=135; Phi=0.42; dey=-23.6; spinz=-68.35;  
Pico2=-14.2; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_12.bin  
Elettronica Multiparametrica  
Number Read.:432128 -- Date and Time: 03/03/2008 00:18:23 --  
Elapsed Time (s): 121; Chi=112.5; Phi=0.5; dey=-16.85; spinz=-76.85; Pico2=-14.9; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_13.bin; Elettronica Multiparametrica  
Number Read.:713728 -- Date and Time: 03/03/2008 00:23:29 --  
Elapsed Time (s): 120; Chi=90; Phi=0.52; dey=-14.1; spinz=-89.1;  
Pico2=-14.2; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_14.bin; Elettronica Multiparametrica  
Number Read.:601088 -- Date and Time: 03/03/2008 00:34:23 --  
Elapsed Time (s): 120; Chi=67.5; Phi=0.5; dey=-16.1; spinz=-100.4;  
Pico2=-14.11; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_15.bin  
Elettronica Multiparametrica  
Number Read.:522240 -- Date and Time: 03/03/2008 00:41:39 --  
Elapsed Time (s): 120; Chi=45; Phi=0.45; dey=-22.1; spinz=-110.2;  
Pico2=-14.6; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_16.bin; Elettronica Multiparametrica  
Number Read.:1116160 -- Date and Time: 03/03/2008 00:52:12 -- Elapsed Time (s): 120; Chi=22.5; Phi=0.35; dey=-31.6; spinz=-116.7; Pico2=-14.1; E= 270 keV

E:\Milena\LaPolca\Misure\Laue Simul 270 keV\_17.bin  
Elettronica Multiparametrica  
Number Read.:619520 -- Date and Time: 03/03/2008 01:03:09 --  
Elapsed Time (s): 120; Chi=0; Phi=0.25; dey=-42.85; spinz=-119.4;  
Pico2=-14.0; E= 270 keV

**P**  
E:\Milena\LaPolca\Misure\Polar 245 270 keV diff\_00.bin  
Elettronica Multiparametrica

Number Read.:3259392 -- Date and Time: 03/03/2008 02:00:56 --  
Elapsed Time (s): 1000; 5 mm Pb; Polarizzazione Pixel 245; E= 270 keV

**S**  
E:\Milena\LaPolca\Misure\Scan 270 keV diff\_00.bin; Elettronica Multiparametrica  
Number Read.:1379630 -- Date and Time:  
03/03/2008 03:02:09 -- Elapsed Time (s): 321; 5 mm Pb; E= 270 keV Row 0

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_02.bin Elettronica Multiparametrica  
Number Read.:1113066 -- Date and Time: 03/03/2008 03:10:31 --  
Elapsed Time (s): 321; 5 mm Pb; E= 270 keV; Row 1

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_03.bin Elettronica Multiparametrica  
Number Read.:1048765 -- Date and Time: 03/03/2008 03:16:21 --  
Elapsed Time (s): 321; 5 mm Pb; E= 270 keV; Row 2

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_04.bin Elettronica Multiparametrica  
Number Read.:1221215 -- Date and Time: 03/03/2008 03:22:08 --  
Elapsed Time (s): 321; 5 mm Pb; E= 270 keV; Row 3

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_05.bin Elettronica Multiparametrica  
Number Read.:1269702 -- Date and Time: 03/03/2008 03:27:50 --  
Elapsed Time (s): 320; 5 mm Pb; E= 270 keV; Row 4

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_06.bin Elettronica Multiparametrica  
Number Read.:1364992 -- Date and Time: 03/03/2008 03:33:28 --  
Elapsed Time (s): 321; 5 mm Pb; E= 270 keV; Row 5

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_07.bin Elettronica Multiparametrica  
Number Read.:1126400 -- Date and Time: 03/03/2008 03:39:52 --  
Elapsed Time (s): 321;  
5 mm Pb; E= 270 keV; Row 6

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_08.bin Elettronica Multiparametrica  
Number Read.:1245184 -- Date and Time: 03/03/2008 03:46:13 --  
Elapsed Time (s): 321;  
5 mm Pb; E= 270 keV; Row 7

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_09.bin Elettronica Multiparametrica  
Number Read.:1097728 -- Date and Time: 03/03/2008 03:51:54 --  
Elapsed Time (s): 321;  
5 mm Pb; E= 270 keV; Row 8

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_10.bin Elettronica Multiparametrica  
Number Read.:1069952 -- Date and Time: 03/03/2008 03:57:44 --  
Elapsed Time (s): 321;



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5 mm Pb; E= 270 keV; Row 9

E:\Milena\LaPolca\Misure\Scan 270 keV diff\_11.bin Elettronica Multiparametrica  
Number Read.:1247232 -- Date and Time: 03/03/2008 04:03:28 --  
Elapsed Time (s): 321;  
5 mm Pb; E= 270 keV; Row 10

**R**

E:\Milena\LaPolca\Misure\Rocking 270 keV\_00.bin Elettronica Multiparametrica  
Number Read.:160239 -- Date and Time: 03/03/2008 04:18:17 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.05; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_01.bin Elettronica Multiparametrica  
Number Read.:309248 -- Date and Time: 03/03/2008 04:20:40 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.06; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_02.bin Elettronica Multiparametrica  
Number Read.:251904 -- Date and Time: 03/03/2008 04:22:54 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.07; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_03.bin Elettronica Multiparametrica  
Number Read.:206848 -- Date and Time: 03/03/2008 04:25:07 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.08; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_04.bin Elettronica Multiparametrica  
Number Read.:265216 -- Date and Time: 03/03/2008 04:27:22 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.09; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_05.bin Elettronica Multiparametrica  
Number Read.:297984 -- Date and Time: 03/03/2008 04:29:37 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.10; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_06.bin Elettronica Multiparametrica  
Number Read.:382976 -- Date and Time: 03/03/2008 04:31:49 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.11; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_07.bin Elettronica Multiparametrica  
Number Read.:439296 -- Date and Time: 03/03/2008 04:34:01 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.12; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_08.bin Elettronica Multiparametrica  
Number Read.:536576 -- Date and Time: 03/03/2008 04:36:11 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.13; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_09.bin Elettronica Multiparametrica  
Number Read.:311296 -- Date and Time: 03/03/2008 04:38:26 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.14; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_10.bin: Elettr Multip;  
Number Read.:289792 -- Date and Time: 03/03/2008 04:40:38 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.15; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_11.bin; Elettr Multip;  
Number Read.:415744 -- Date and Time: 03/03/2008 04:42:51 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.16; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_12.bin; Elettr Multip;  
Number Read.:524288 -- Date and Time: 03/03/2008 04:45:16 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.17; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_13.bin; Elettr Multip;  
Number Read.:534528 -- Date and Time: 03/03/2008 04:47:33 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.18; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_14.bin Elettronica Multiparametrica  
Number Read.:463872 -- Date and Time: 03/03/2008 04:49:45 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.19; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_15.bin Elettronica Multiparametrica  
Number Read.:362496 -- Date and Time: 03/03/2008 04:51:56 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.20; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_16.bin Elettronica Multiparametrica  
Number Read.:420864 -- Date and Time: 03/03/2008 04:54:10 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.21; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_17.bin Elettronica Multiparametrica  
Number Read.:326656 -- Date and Time: 03/03/2008 04:56:21 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.22; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_18.bin Elettronica Multiparametrica  
Number Read.:496640 -- Date and Time: 03/03/2008 04:58:40 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.23; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_19.bin Elettronica Multiparametrica  
Number Read.:849920 -- Date and Time: 03/03/2008 05:00:54 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.24; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_20.bin Elettronica Multiparametrica  
Number Read.:852992 -- Date and Time: 03/03/2008 05:03:04 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.25; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_21.bin Elettronica Multiparametrica  
Number Read.:809984 -- Date and Time: 03/03/2008 05:05:14 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.26; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_22.bin Elettronica Multiparametrica  
Number Read.:496640 -- Date and Time: 03/03/2008 05:07:24 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.27; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_23.bin Elettronica Multiparametrica  
Number Read.:507904 -- Date and Time: 03/03/2008 05:09:32 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.28; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_24.bin Elettronica Multiparametrica  
Number Read.:244728 -- Date and Time: 03/03/2008 05:11:42 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.29; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_25.bin Elettronica Multiparametrica  
Number Read.:333824 -- Date and Time: 03/03/2008 05:14:15 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.30; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_26.bin Elettronica Multiparametrica  
Number Read.:223232 -- Date and Time: 03/03/2008 05:16:25 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.31; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_27.bin Elettronica Multiparametrica



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Number Read.:307200 -- Date and Time: 03/03/2008 05:18:36 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.32; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_28.bin Elettronica Multiparametrica

Number Read.:301056 -- Date and Time: 03/03/2008 05:20:45 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.33; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_29.bin Elettronica Multiparametrica

Number Read.:315392 -- Date and Time: 03/03/2008 05:22:58 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.34; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_30.bin Elettronica Multiparametrica

Number Read.:294912 -- Date and Time: 03/03/2008 05:25:11 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.35; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_31.bin Elettronica Multiparametrica

Number Read.:343040 -- Date and Time: 03/03/2008 05:27:24 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.36; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_32.bin Elettronica Multiparametrica

Number Read.:372736 -- Date and Time: 03/03/2008 05:29:39 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.37; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_33.bin Elettronica Multiparametrica

Number Read.:418816 -- Date and Time: 03/03/2008 05:31:52 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.38; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_34.bin Elettronica Multiparametrica

Number Read.:605184 -- Date and Time: 03/03/2008 05:34:03 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.39; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_35.bin Elettronica Multiparametrica

Number Read.:421888 -- Date and Time: 03/03/2008 05:36:16 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.40; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_36.bin Elettronica Multiparametrica

Number Read.:324608 -- Date and Time: 03/03/2008 05:38:25 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=0.41; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_37.bin Elettronica Multiparametrica

Number Read.:384000 -- Date and Time: 03/03/2008 05:40:46 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.42; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_38.bin Elettronica Multiparametrica

Number Read.:225280 -- Date and Time: 03/03/2008 05:42:57 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.43; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_39.bin Elettronica Multiparametrica

Number Read.:271360 -- Date and Time: 03/03/2008 05:45:19 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.44; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_40.bin Elettronica Multiparametrica

Number Read.:188416 -- Date and Time: 03/03/2008 05:47:35 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.45; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV\_41.bin Elettronica Multiparametrica

Number Read.:190464 -- Date and Time: 03/03/2008 05:49:45 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=0.46; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_00.bin Elettronica Multiparametrica

Number Read.:363520 -- Date and Time: 03/03/2008 06:02:29 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.45; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_01.bin Elettronica Multiparametrica

Number Read.:335872 -- Date and Time: 03/03/2008 06:04:56 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.46; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_02.bin Elettronica Multiparametrica

Number Read.:319488 -- Date and Time: 03/03/2008 06:07:08 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.47; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_03.bin Elettronica Multiparametrica

Number Read.:312320 -- Date and Time: 03/03/2008 06:09:22 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=1.48; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_04.bin Elettronica Multiparametrica

Number Read.:346112 -- Date and Time: 03/03/2008 06:11:31 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.49; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_05.bin Elettronica Multiparametrica

Number Read.:305152 -- Date and Time: 03/03/2008 06:13:44 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.50; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_06.bin Elettronica Multiparametrica

Number Read.:281600 -- Date and Time: 03/03/2008 06:15:56 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=1.51; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_07.bin Elettronica Multiparametrica

Number Read.:303104 -- Date and Time: 03/03/2008 06:18:07 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=1.52; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_08.bin Elettronica Multiparametrica

Number Read.:551936 -- Date and Time: 03/03/2008 06:20:33 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.53; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_09.bin Elettronica Multiparametrica

Number Read.:603136 -- Date and Time: 03/03/2008 06:22:43 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.54; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_10.bin Elettronica Multiparametrica

Number Read.:698368 -- Date and Time: 03/03/2008 06:24:53 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.55; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_11.bin Elettronica Multiparametrica

Number Read.:519168 -- Date and Time: 03/03/2008 06:27:03 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.56; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_12.bin Elettronica Multiparametrica

Number Read.:700416 -- Date and Time: 03/03/2008 06:29:14 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.57; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_13.bin Elettronica Multiparametrica

Number Read.:680960 -- Date and Time: 03/03/2008 06:31:24 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.58; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_14.bin Elettronica Multiparametrica

Number Read.:494592 -- Date and Time: 03/03/2008 06:33:35 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.59; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_15.bin Elettronica Multiparametrica

Number Read.:565248 -- Date and Time: 03/03/2008 06:35:47 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.60; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_16.bin Elettronica Multiparametrica

Number Read.:582656 -- Date and Time: 03/03/2008 06:37:58 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.61; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_17.bin Elettronica Multiparametrica

Number Read.:430080 -- Date and Time: 03/03/2008 06:40:13 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.62; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_18.bin Elettronica Multiparametrica

Number Read.:437248 -- Date and Time: 03/03/2008 06:42:23 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.63; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_19.bin Elettronica Multiparametrica

Number Read.:419840 -- Date and Time: 03/03/2008 06:44:34 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.64; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_20.bin Elettronica Multiparametrica

Number Read.:561152 -- Date and Time: 03/03/2008 06:46:45 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.65; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_21.bin Elettronica Multiparametrica

Number Read.:488448 -- Date and Time: 03/03/2008 06:49:18 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.66; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_22.bin Elettronica Multiparametrica

Number Read.:433152 -- Date and Time: 03/03/2008 06:51:33 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.67; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_23.bin Elettronica Multiparametrica

Number Read.:399360 -- Date and Time: 03/03/2008 06:53:43 --  
Elapsed Time (s): 121; 5 mm Pb; E= 270 keV; phi=1.68; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_24.bin Elettronica Multiparametrica

Number Read.:421888 -- Date and Time: 03/03/2008 06:55:53 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.69; chi=0.0

E:\Milena\LaPolca\Misure\Rocking 270 keV b\_25.bin Elettronica Multiparametrica

Number Read.:363520 -- Date and Time: 03/03/2008 06:58:10 --  
Elapsed Time (s): 120; 5 mm Pb; E= 270 keV; phi=1.70; chi=0.0

**A**

E:\Milena\LaPolca\Misure\Long 360\_00.bin Elettronica Multiparametrica  
Number Read.:39450624 -- Date and Time: 03/03/2008 07:09:17 --  
Elapsed Time (s): 2500; 5 mm Pb; Direct beam on pixel 153

**90 keV**

**R**

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_00.bin  
Elettronica Multiparametrica

Number Read.:462848 -- Date and Time: 03/03/2008 08:03:45 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.6; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_01.bin  
Elettronica Multiparametrica

Number Read.:397312 -- Date and Time: 03/03/2008 08:06:02 --  
Elapsed Time (s): 121; 5 mm Pb; phi 2.61; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_02.bin  
Elettronica Multiparametrica

Number Read.:373760 -- Date and Time: 03/03/2008 08:08:22 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.62; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_03.bin  
Elettronica Multiparametrica

Number Read.:482304 -- Date and Time: 03/03/2008 08:10:38 --  
Elapsed Time (s): 121; 5 mm Pb; phi 2.63; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_04.bin  
Elettronica Multiparametrica

Number Read.:462848 -- Date and Time: 03/03/2008 08:12:52 --  
Elapsed Time (s): 121; 5 mm Pb; phi 2.64; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_05.bin  
Elettronica Multiparametrica

Number Read.:410624 -- Date and Time: 03/03/2008 08:15:10 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.65; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_06.bin  
Elettronica Multiparametrica

Number Read.:484352 -- Date and Time: 03/03/2008 08:17:24 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.66; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_07.bin  
Elettronica Multiparametrica

Number Read.:481280 -- Date and Time: 03/03/2008 08:19:40 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.67; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_08.bin  
Elettronica Multiparametrica

Number Read.:452608 -- Date and Time: 03/03/2008 08:21:55 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.68; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_09.bin  
Elettronica Multiparametrica

Number Read.:497664 -- Date and Time: 03/03/2008 08:24:08 --  
Elapsed Time (s): 121; 5 mm Pb; phi 2.69; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_10.bin  
Elettronica Multiparametrica

Number Read.:499712 -- Date and Time: 03/03/2008 08:26:23 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.70; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_11.bin  
Elettronica Multiparametrica

Number Read.:499712 -- Date and Time: 03/03/2008 08:28:38 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.71; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_12.bin  
Elettronica Multiparametrica

Number Read.:521216 -- Date and Time: 03/03/2008 08:30:51 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.72; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_13.bin  
Elettronica Multiparametrica

Number Read.:519168 -- Date and Time: 03/03/2008 08:33:04 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.73; dey=-41.35; spinz=-178.4



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E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_14.bin  
Elettronica Multiparametrica  
Number Read.:395264 -- Date and Time: 03/03/2008 08:35:18 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.74; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_15.bin  
Elettronica Multiparametrica  
Number Read.:389120 -- Date and Time: 03/03/2008 08:37:30 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.75; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_16.bin  
Elettronica Multiparametrica  
Number Read.:416768 -- Date and Time: 03/03/2008 08:39:43 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.76; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_17.bin  
Elettronica Multiparametrica  
Number Read.:354304 -- Date and Time: 03/03/2008 08:41:56 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.77; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_18.bin  
Elettronica Multiparametrica  
Number Read.:533552 -- Date and Time: 03/03/2008 08:44:13 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.78; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_19.bin  
Elettronica Multiparametrica  
Number Read.:633856 -- Date and Time: 03/03/2008 08:46:33 --  
Elapsed Time (s): 120; 5 mm Pb; phi 2.79; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_20.bin  
Elettronica Multiparametrica  
Number Read.:547840 -- Date and Time: 03/03/2008 08:48:45 --  
Elapsed Time (s): 120;  
5 mm Pb; phi 2.80; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_21.bin  
Elettronica Multiparametrica  
Number Read.:591872 -- Date and Time: 03/03/2008 08:51:04 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.81; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_22.bin  
Elettronica Multiparametrica  
Number Read.:715776 -- Date and Time: 03/03/2008 08:53:15 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.82; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_23.bin  
Elettronica Multiparametrica  
Number Read.:1106944 -- Date and Time: 03/03/2008 08:55:49 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.83; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_24.bin  
Elettronica Multiparametrica  
Number Read.:1219584 -- Date and Time: 03/03/2008 08:58:09 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.84; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_25.bin  
Elettronica Multiparametrica  
Number Read.:1199104 -- Date and Time: 03/03/2008 09:00:36 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.85; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_26.bin  
Elettronica Multiparametrica  
Number Read.:1184768 -- Date and Time: 03/03/2008 09:02:58 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.86; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_27.bin  
Elettronica Multiparametrica  
Number Read.:1250304 -- Date and Time: 03/03/2008 09:05:59 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.87; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_28.bin  
Elettronica Multiparametrica  
Number Read.:956416 -- Date and Time: 03/03/2008 09:10:14 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.88; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_29.bin  
Elettronica Multiparametrica  
Number Read.:608256 -- Date and Time: 03/03/2008 09:29:13 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.90; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_30.bin  
Elettronica Multiparametrica  
Number Read.:457728 -- Date and Time: 03/03/2008 09:31:59 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.91; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_31.bin  
Elettronica Multiparametrica  
Number Read.:627712 -- Date and Time: 03/03/2008 09:34:54 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.92; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_32.bin  
Elettronica Multiparametrica  
Number Read.:522240 -- Date and Time: 03/03/2008 09:37:19 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.93; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_33.bin  
Elettronica Multiparametrica  
Number Read.:563200 -- Date and Time: 03/03/2008 09:39:57 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.94; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_34.bin  
Elettronica Multiparametrica  
Number Read.:581632 -- Date and Time: 03/03/2008 09:42:17 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.95; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_35.bin  
Elettronica Multiparametrica  
Number Read.:476160 -- Date and Time: 03/03/2008 09:44:35 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.96; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_36.bin  
Elettronica Multiparametrica  
Number Read.:417792 -- Date and Time: 03/03/2008 09:47:35 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.97; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_37.bin  
Elettronica Multiparametrica  
Number Read.:400384 -- Date and Time: 03/03/2008 09:50:14 --  
Elapsed Time (s): 120  
5 mm Pb; phi 2.98; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_38.bin  
Elettronica Multiparametrica  
Number Read.:477184 -- Date and Time: 03/03/2008 09:52:48 --  
Elapsed Time (s): 120

5 mm Pb; phi 2.99; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_39.bin  
Elettronica Multiparametrica  
Number Read.:404480 -- Date and Time: 03/03/2008 09:55:52 --  
Elapsed Time (s): 120  
5 mm Pb; phi 3.00; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_40.bin  
Elettronica Multiparametrica  
Number Read.:437248 -- Date and Time: 03/03/2008 09:58:19 --  
Elapsed Time (s): 120  
5 mm Pb; phi 3.01; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_41.bin  
Elettronica Multiparametrica  
Number Read.:405504 -- Date and Time: 03/03/2008 10:02:16 --  
Elapsed Time (s): 121  
5 mm Pb; phi 3.02; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_42.bin  
Elettronica Multiparametrica  
Number Read.:423936 -- Date and Time: 03/03/2008 10:04:53 --  
Elapsed Time (s): 120  
5 mm Pb; phi 3.03; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV\_43.bin  
Elettronica Multiparametrica  
Number Read.:290816 -- Date and Time: 03/03/2008 10:13:38 --  
Elapsed Time (s): 121  
5 mm Pb; phi 3.04; dey=-41.35; spinz=-178.4

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_00.bin  
Elettronica Multiparametrica  
Number Read.:346112 -- Date and Time: 03/03/2008 10:29:36 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.80; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_01.bin  
Elettronica Multiparametrica  
Number Read.:385024 -- Date and Time: 03/03/2008 10:33:01 --  
Elapsed Time (s): 121  
5 mm Pb; phi -0.825; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_02.bin  
Elettronica Multiparametrica  
Number Read.:390144 -- Date and Time: 03/03/2008 10:35:23 --  
Elapsed Time (s): 120; 5 mm Pb  
phi -0.85; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_03.bin  
Elettronica Multiparametrica  
Number Read.:366592 -- Date and Time: 03/03/2008 10:38:25 --  
Elapsed Time (s): 120; 5 mm Pb; phi -0.87; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_04.bin;  
Elettronica Multiparametrica  
Number Read.:504832 -- Date and Time: 03/03/2008 10:41:54 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.89; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_05.bin  
Elettronica Multiparametrica  
Number Read.:491520 -- Date and Time: 03/03/2008 10:44:24 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.91; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_06.bin  
Elettronica Multiparametrica

Number Read.:581632 -- Date and Time: 03/03/2008 10:47:31 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.80; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_07.bin  
Elettronica Multiparametrica  
Number Read.:503808 -- Date and Time: 03/03/2008 10:50:37 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.82; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_08.bin  
Elettronica Multiparametrica  
Number Read.:467968 -- Date and Time: 03/03/2008 10:53:38 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.84; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_09.bin  
Elettronica Multiparametrica  
Number Read.:484352 -- Date and Time: 03/03/2008 10:56:42 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.86; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_10.bin  
Elettronica Multiparametrica  
Number Read.:479232 -- Date and Time: 03/03/2008 10:59:06 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.88; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_12.bin  
Elettronica Multiparametrica  
Number Read.:369664 -- Date and Time: 03/03/2008 11:01:39 --  
Elapsed Time (s): 121  
5 mm Pb; phi -0.89; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_14.bin  
Elettronica Multiparametrica  
Number Read.:433152 -- Date and Time: 03/03/2008 11:04:18 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.90; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_15.bin  
Elettronica Multiparametrica  
Number Read.:451584 -- Date and Time: 03/03/2008 11:06:37 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.91; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_16.bin  
Elettronica Multiparametrica  
Number Read.:478208 -- Date and Time: 03/03/2008 11:11:01 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.92; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_17.bin  
Elettronica Multiparametrica  
Number Read.:590848 -- Date and Time: 03/03/2008 11:13:17 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.93; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_18.bin  
Elettronica Multiparametrica  
Number Read.:516096 -- Date and Time: 03/03/2008 11:15:46 --  
Elapsed Time (s): 121  
5 mm Pb; phi -0.95; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_19.bin  
Elettronica Multiparametrica  
Number Read.:485376 -- Date and Time: 03/03/2008 11:18:55 --  
Elapsed Time (s): 120; 5 mm Pb  
phi -0.95; dey=-41.55; spinz=-178.90



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E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_20.bin  
Elettronica Multiparametrica  
Number Read.:465920 -- Date and Time: 03/03/2008 11:21:05 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.96; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_21.bin  
Elettronica Multiparametrica  
Number Read.:479232 -- Date and Time: 03/03/2008 11:23:28 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.97; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_22.bin  
Elettronica Multiparametrica  
Number Read.:533504 -- Date and Time: 03/03/2008 11:25:42 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.98; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_23.bin  
Elettronica Multiparametrica  
Number Read.:603136 -- Date and Time: 03/03/2008 11:27:57 --  
Elapsed Time (s): 120  
5 mm Pb; phi -0.99; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_24.bin  
Elettronica Multiparametrica  
Number Read.:598016 -- Date and Time: 03/03/2008 11:30:30 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.00; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_25.bin  
Elettronica Multiparametrica  
Number Read.:590848 -- Date and Time: 03/03/2008 11:33:38 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.01; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_26.bin  
Elettronica Multiparametrica  
Number Read.:1049600 -- Date and Time: 03/03/2008 11:36:37 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.02; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_27.bin  
Elettronica Multiparametrica  
Number Read.:1078272 -- Date and Time: 03/03/2008 11:38:59 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.03; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_29.bin  
Elettronica Multiparametrica  
Number Read.:1075200 -- Date and Time: 03/03/2008 11:41:42 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.04; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_30.bin  
Elettronica Multiparametrica  
Number Read.:1084416 -- Date and Time: 03/03/2008 11:44:23 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.05; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_31.bin  
Elettronica Multiparametrica  
Number Read.:1111040 -- Date and Time: 03/03/2008 11:47:02 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.06; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_32.bin  
Elettronica Multiparametrica  
Number Read.:941056 -- Date and Time: 03/03/2008 11:49:54 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.07; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_33.bin  
Elettronica Multiparametrica  
Number Read.:780288 -- Date and Time: 03/03/2008 11:52:23 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.08; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_34.bin  
Elettronica Multiparametrica  
Number Read.:649216 -- Date and Time: 03/03/2008 11:55:29 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.09; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_35.bin  
Elettronica Multiparametrica  
Number Read.:533504 -- Date and Time: 03/03/2008 11:57:46 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.10; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_36.bin  
Elettronica Multiparametrica  
Number Read.:491520 -- Date and Time: 03/03/2008 12:00:05 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.11; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_37.bin  
Elettronica Multiparametrica  
Number Read.:526336 -- Date and Time: 03/03/2008 12:02:25 --  
Elapsed Time (s): 121  
5 mm Pb; phi -1.12; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_38.bin  
Elettronica Multiparametrica  
Number Read.:487424 -- Date and Time: 03/03/2008 12:05:31 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.13; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_39.bin  
Elettronica Multiparametrica  
Number Read.:491520 -- Date and Time: 03/03/2008 12:08:10 --  
Elapsed Time (s): 121  
5 mm Pb; phi -1.14; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_40.bin  
Elettronica Multiparametrica  
Number Read.:458752 -- Date and Time: 03/03/2008 12:10:23 --  
Elapsed Time (s): 121  
5 mm Pb; phi -1.15; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_41.bin  
Elettronica Multiparametrica  
Number Read.:358400 -- Date and Time: 03/03/2008 12:12:43 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.16; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_42.bin  
Elettronica Multiparametrica  
Number Read.:465920 -- Date and Time: 03/03/2008 12:15:13 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.17; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_43.bin  
Elettronica Multiparametrica  
Number Read.:356352 -- Date and Time: 03/03/2008 12:18:18 --  
Elapsed Time (s): 120  
5 mm Pb; phi -1.18; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_44.bin  
Elettronica Multiparametrica  
Number Read.:455680 -- Date and Time: 03/03/2008 12:20:34 --  
Elapsed Time (s): 120

5 mm Pb; phi -1.19; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_45.bin  
Elettronica Multiparametrica  
Number Read.:365568 -- Date and Time: 03/03/2008 12:22:50 --  
Elapsed Time (s): 121  
5 mm Pb; phi -1.20; dey=-41.55; spinz=-178.90

E:\Milena\LaPolca\Misure\Rocking Curve 90keV-180\_46.bin  
Elettronica Multiparametrica  
Number Read.:416768 -- Date and Time: 03/03/2008 12:25:01 --  
Elapsed Time (s): 121  
5 mm Pb; phi -1.21; dey=-41.55; spinz=-178.90

**A**  
E:\Milena\LaPolca\Misure\Bkg-030308\_00.bin; Elettronica Multiparametrica; Number Read.:16965484 -- Date and Time: 03/03/2008 12:27:41 -- Elapsed Time (s): 5717; shutter closed

**B**  
E:\Milena\LaPolca\Misure\fascio trasmesso\_00.bin; Elettronica Multiparametrica; Number Read.:1167360 -- Date and Time: 03/03/2008 16:05:32 -- Elapsed Time (s): 102; 90 filtrati con phi=-1.02 (picco fascio diffratto)

**345 keV**  
E:\Milena\LaPolca\Misure\diffratto 345keV\_00.bin; Elettronica Multiparametrica; Number Read.: 4732 -- Date and Time: 03/03/2008 16:35:36 -- Elapsed Time (s): 32; phi=-0.44

E:\Milena\LaPolca\Misure\diffratto 345keV\_01.bin; Elettronica Multiparametrica; Number Read.: 7817 -- Date and Time: 03/03/2008 16:36:19 -- Elapsed Time (s): 52; phi=-0.44

E:\Milena\LaPolca\Misure\diffratto 345keV\_02.bin; Elettronica Multiparametrica; Number Read.:1993728 -- Date and Time: 03/03/2008 17:03:00 -- Elapsed Time (s): 175; phi=-1.02 (condizioni di diffrazione per i 90 keV al fine di ridurre il flusso).

E:\Milena\LaPolca\Misure\diffratto 345keV\_03.bin; Elettronica Multiparametrica; Number Read.:200989 -- Date and Time: 03/03/2008 17:13:26 -- Elapsed Time (s): 304; phi=0.42 - condizione di bragg 4 armonica per Cu

E:\Milena\LaPolca\Misure\diffratto 345keV\_04.bin; Elettr Multipa; Number Read.:1667072 -- Date and Time: 03/03/2008 17:29:20 -- Elapsed Time (s): 135; phi=0.66 chi=90; non assorbitore; Pb laterale per fascio tramsesso

E:\Milena\LaPolca\Misure\diffratto 345keV\_05.bin; Elettronica Multiparametrica  
Number Read.:971776 -- Date and Time: 03/03/2008 17:38:49 --  
Elapsed Time (s): 300; phi=0.66 chi=90; 3 mm di Cu; Pb laterale per fascio tramsesso

E:\Milena\LaPolca\Misure\diffratto 345keV\_08.bin Elettronica Multiparametrica  
Number Read.:223411 -- Date and Time: 03/03/2008 17:51:51 --  
Elapsed Time (s): 302; phi=0.66 chi=90; 3 mm di Cu + 4 Pb; Pb laterale per fascio tramsesso

**S**  
E:\Milena\LaPolca\Misure\scan 345keV\_00.bin Elettronica Multiparametrica  
Number Read.:11221604 -- Date and Time: 03/03/2008 18:21:22 --  
Elapsed Time (s): 3339; phi=0.66 chi=90; 3 mm di Cu; Pb laterale per fascio tramsesso; scan 13x13

**A**  
E:\Milena\LaPolca\Misure\bkg-scan 345keV\_00.bin; Elettronica Multiparametrica  
Number Read.:10046456 -- Date and Time: 03/03/2008 19:19:16 --  
Elapsed Time (s): 3601; scan per bkg, no diffratto; phi=0.11 chi=90; 3 mm di Cu;

Pb laterale per fascio tramsesso; scan 13x13

**L**  
E:\Milena\LaPolca\Misure\laue simul 345keV\_00.bin Elettronica Multiparametrica  
Number Read.: 94474 -- Date and Time: 03/03/2008 21:53:16 --  
Elapsed Time (s): 121  
phi=0.44 chi=0; 4mm Pb 3 mm di Cu

E:\Milena\LaPolca\Misure\laue simul 345keV\_01.bin Elettronica Multiparametrica  
Number Read.:106724 -- Date and Time: 03/03/2008 22:15:39 --  
Elapsed Time (s): 122; phi=0.5 chi=0; 4mm Pb 3 mm di Cu; dey=-34.6, Spinz=-110.05; pico2=-14.6

E:\Milena\LaPolca\Misure\laue simul 345keV\_02.bin Elettronica Multiparametrica  
Number Read.:207872 -- Date and Time: 03/03/2008 22:36:13 --  
Elapsed Time (s): 121; phi=0.6 chi=45; 4mm Pb 3 mm di Cu; dey=-27.5, Spinz=-105.25; pico2=-13.9

E:\Milena\LaPolca\Misure\laue simul 345keV\_03.bin Elettronica Multiparametrica  
Number Read.:120726 -- Date and Time: 03/03/2008 22:44:52 --  
Elapsed Time (s): 122; phi=0.65 chi=67.5; 4mm Pb 3 mm di Cu; dey=-23.1, Spinz=-97.65; pico2=-13.6

E:\Milena\LaPolca\Misure\laue simul 345keV\_04.bin Elettronica Multiparametrica  
Number Read.: 92260 -- Date and Time: 03/03/2008 22:52:22 --  
Elapsed Time (s): 121  
phi=0.67 chi=90; 4mm Pb 3 mm di Cu; dey=-21.7, Spinz=-89.35; pico2=-14.8

E:\Milena\LaPolca\Misure\laue simul 345keV\_05.bin Elettronica Multiparametrica  
Number Read.: 90527 -- Date and Time: 03/03/2008 22:59:03 --  
Elapsed Time (s): 122  
phi=0.65 chi=112.5; 4mm Pb 3 mm di Cu; dey=-23.7, Spinz=-80.85; pico2=-14.2

E:\Milena\LaPolca\Misure\laue simul 345keV\_06.bin Elettronica Multiparametrica  
Number Read.: 99398 -- Date and Time: 03/03/2008 23:08:05 --  
Elapsed Time (s): 121  
phi=0.58 chi=135; 4mm Pb 3 mm di Cu; dey=-28.7, Spinz=-73.75; pico2=-14.1

E:\Milena\LaPolca\Misure\laue simul 345keV\_07.bin Elettronica Multiparametrica  
Number Read.: 89861 -- Date and Time: 03/03/2008 23:20:36 --  
Elapsed Time (s): 121  
phi=0.49 chi=157.5; 4mm Pb 3 mm di Cu; dey=-36.2, Spinz=-69.25; pico2=-14.2

E:\Milena\LaPolca\Misure\laue simul 345keV\_08.bin; Elettr Multip; Number Read.: 91092 -- Date and Time: 03/03/2008 23:31:18 --  
Elapsed Time (s): 122  
phi=0.37 chi=180; 4mm Pb 3 mm di Cu; dey=-44.65, Spinz=-68.05; pico2=-14.2

E:\Milena\LaPolca\Misure\laue simul 345keV\_09.bin; Elettr Multip; Number Read.:177088 -- Date and Time: 03/03/2008 23:39:03 --  
Elapsed Time (s): 194; phi=1.36 chi=180; 4mm Pb 3 mm di Cu; dey=-42.65, Spinz=-112.0; pico2=-14.5

**04/03/2008 Quarto giorno**

E:\Milena\LaPolca\Misure\laue simul 345keV\_10.bin Elettronica Multiparametrica  
Number Read.:157727 -- Date and Time: 04/03/2008 00:00:55 --  
Elapsed Time (s): 182; phi=1.43 chi=157.5; 4mm Pb 3 mm di Cu; dey=-51.85, Spinz=-110.6; pico2=-14.1

E:\Milena\LaPolca\Misure\laue simul 345keV\_11.bin Elettronica Multiparametrica  
Number Read.:156496 -- Date and Time: 04/03/2008 00:16:00 --  
Elapsed Time (s): 181; phi=1.50 chi=145; 4mm Pb 3 mm di Cu; dey=-56.2, Spinz=-108.3; pico2=-14.1

E:\Milena\LaPolca\Misure\laue simul 345keV\_12.bin Elettronica Multiparametrica  
Number Read.:114125 -- Date and Time: 04/03/2008 00:23:17 --  
Elapsed Time (s): 181; phi=1.55 chi=135; 4mm Pb 3 mm di Cu; dey=-59.0, Spinz=-106.25; pico2=-14.7

E:\Milena\LaPolca\Misure\laue simul 345keV\_13.bin Elettronica Multiparametrica  
Number Read.: 83808 -- Date and Time: 04/03/2008 00:31:37 --  
Elapsed Time (s): 181  
phi=1.6 chi=112.5; 4mm Pb 3 mm di Cu; dey=-64.0, Spinz=-99.00; pico2=-14.1

E:\Milena\LaPolca\Misure\laue simul 345keV\_14.bin Elettronica Multiparametrica  
Number Read.: 83176 -- Date and Time: 04/03/2008 00:41:05 --  
Elapsed Time (s): 182  
phi=1.64 chi=90; 4mm Pb 3 mm di Cu; dey=-66.25, Spinz=-90.5; pico2=-14.4

E:\Milena\LaPolca\Misure\laue simul 345keV\_15.bin Elettronica Multiparametrica  
Number Read.: 99620 -- Date and Time: 04/03/2008 00:50:53 --  
Elapsed Time (s): 182  
phi=1.62 chi=67.5; 4mm Pb 3 mm di Cu; dey=-64.25, Spinz=-82.0; pico2=-14.2

E:\Milena\LaPolca\Misure\laue simul 345keV\_16.bin Elettronica Multiparametrica  
Number Read.:119810 -- Date and Time: 04/03/2008 01:03:06 --  
Elapsed Time (s): 182; phi=1.6 chi=45; 4mm Pb 3 mm di Cu; dey=-60.25, Spinz=-74.9; pico2=-14.1

E:\Milena\LaPolca\Misure\laue simul 345keV\_17.bin; Elettr Multip;  
Number Read.:138291 -- Date and Time: 04/03/2008 01:12:45 --  
Elapsed Time (s): 182; phi=1.48 chi=22.5; 4mm Pb 3 mm di Cu; dey=-53.5, Spinz=-70.0; pico2=-14.3

E:\Milena\LaPolca\Misure\laue simul 345keV\_18.bin; Elett Mult;  
Number Read.:124508 -- Date and Time: 04/03/2008 01:20:27 --  
Elapsed Time (s): 182; phi=1.40 chi=0; 4mm Pb 3 mm di Cu; dey=-44.3, Spinz=-68.0; pico2=-13.8

## B

E:\Milena\LaPolca\Misure\diffracted 345-coinc test\_00.bin  
Elet Multip; Number Read.:483626 -- Date and Time:  
04/03/2008 01:25:49 -- Elapsed Time (s): 676; phi=1.40 chi=0; 4mm Pb 3 mm di Cu; dey=-44.3, Spinz=-68.0; coinc time=1 us

## P

E:\Milena\LaPolca\Misure\polar245-345-diffratto\_01.bin  
Elett Multip; Number Read.:490806 -- Date and Time:  
04/03/2008 01:40:04 -- Elapsed Time (s): 1002  
phi=1.40 chi=0; 4mm Pb 3 mm di Cu; dey=-54.3, Spinz=-60.5; coinc time=1 us

**90 keV**

## B

E:\Milena\LaPolca\Misure\test-soppress90keV\_00.bin; Elett Multip;  
Number Read.:2010112 -- Date and Time: 04/03/2008 02:07:04 --  
Elapsed Time (s): 300; phi=-1.02 chi=0; 5mm Pb 3 mm di Cu; dey=-54.3, Spinz=-60.5; coinc time=1 us; condizione bragg per 90 keV  
(phi=-1.02)

E:\Milena\LaPolca\Misure\test-soppress90keV\_01.bin; Elet Multip;  
Number Read.:2378752 -- Date and Time: 04/03/2008 02:12:30 --

Elapsed Time (s): 300; phi=0 chi=0; 5mm Pb 3 mm di Cu; dey=-54.3, Spinz=-60.5; coinc time=1 us; Bragg per 90 keV (phi=0)

E:\Milena\LaPolca\Misure\test efficienza\_00.bin; Elettronica Multiparametrica; Number Read.:828416 -- Date and Time:  
04/03/2008 02:47:24 -- Elapsed Time (s): 107; phi=0 chi=0; 5mm Pb 3 mm di Cu; dey=-54.3, Spinz=-60.5; coinc time=1 us

## P

E:\Milena\LaPolca\Misure\Polar 85 90 keV diffratto\_00.bin  
Elett Multip; Number Read.:1936384 -- Date and Time:  
04/03/2008 03:20:33 -- Elapsed Time (s): 1001; phi=-1.02 chi=0;  
5mm Pb 3 mm di Cu; dey=-51.15, Spinz=-196.55; coinc time=1 us

E:\Milena\LaPolca\Misure\Polar 95 90 keV diffratto\_00.bin  
Elettr Multip; Number Read.:1638400 -- Date and Time:  
04/03/2008 03:39:26 -- Elapsed Time (s): 1001; phi=-1.02 chi=0;  
5mm Pb 3 mm di Cu; dey=-26.15, Spinz=-196.55; coinc time=1 us

E:\Milena\LaPolca\Misure\Polar 255 90 keV diffratto\_00.bin  
Elettr Multip; Number Read.:1874944 -- Date and Time:  
04/03/2008 03:57:22 -- Elapsed Time (s): 1001; phi=-1.02 chi=0;  
5mm Pb 3 mm di Cu; dey=-26.15, Spinz=-171.55; coinc time=1 us

E:\Milena\LaPolca\Misure\Polar 85 270 keV diffratto\_00.bin  
Elett Multip; Number Read.:1996800 -- Date and Time:  
04/03/2008 04:22:50 -- Elapsed Time (s): 1001; phi=-1.55 chi=0;  
5mm Pb 3 mm di Cu; dey=-54.75, Spinz=-77.75; coinc time=1 us

E:\Milena\LaPolca\Misure\Polar 95 270 keV diffratto\_00.bin  
Elettronica Multip; Number Read.:1904640 -- Date and Time:  
04/03/2008 04:41:08 -- Elapsed Time (s): 1001; phi=-1.55  
chi=0; 5mm Pb 3 mm di Cu; dey=-29.75, Spinz=-77.75; coinc  
time=1 us

E:\Milena\LaPolca\Misure\Polar 255 270 keV diffratto\_00.bin  
Elett Multip; Number Read.:1695744 -- Date and Time:  
04/03/2008 04:58:55 -- Elapsed Time (s): 1001; phi=-1.55 chi=0;  
5mm Pb 3 mm di Cu; dey=-29.75, Spinz=-52.75; coinc time=1 us

E:\Milena\LaPolca\Misure\Polar 85 345 keV diffratto\_00.bin  
Elett Multip; Number Read.:22114304 -- Date and Time:  
04/03/2008 05:55:09 -- Elapsed Time (s): 1000; phi=1.4, chi=0; dey  
=-54.5, spinz = -35.5; 4 mm Pb + 3 mm Cu; coinc time = 1 us

E:\Milena\LaPolca\Misure\Polar 95 345 keV diffratto\_01.bin  
Elett Multip; Number Read.:23391232 -- Date and Time:  
04/03/2008 06:13:03 -- Elapsed Time (s): 1000; phi=1.4, chi=0; dey  
=-29.5, spinz = -35.5; 4 mm Pb + 3 mm Cu; coinc time = 1 us

E:\Milena\LaPolca\Misure\Polar 255 345 keV diffratto\_00.bin  
Elett Multip; Number Read.:1229824 -- Date and Time:  
04/03/2008 06:31:08 -- Elapsed Time (s): 1001; phi=1.4, chi=0; dey  
=-29.5, spinz = -60.5; 4 mm Pb + 3 mm Cu; coinc time = 1 us

## B

E:\Milena\LaPolca\Misure\Trasmesso 1000 s\_00.bin; Elettronica Multip;  
Number Read.:5913600 -- Date and Time: 04/03/2008  
07:20:51 -- Elapsed Time (s): 1000; phi=-1.02, chi=0; dey =-43.85,  
spinz = -89.95; 5 mm Pb + 3 mm Cu; coinc time = 1 us

E:\Milena\LaPolca\Misure\Trasmesso 1000 s\_01.bin; Elettr Multip;  
Number Read.:5941248 -- Date and Time: 04/03/2008 07:40:21 --  
Elapsed Time (s): 1000  
phi=-1.02, chi=0; dey =-43.85, spinz = -89.95; 5 mm Pb + 3 mm Cu;  
coinc time = 4 us

E:\Milena\LaPolca\Misure\Trasmesso 1000 s\_02.bin; Elettr Multip.  
Number Read.: 99328 -- Date and Time: 04/03/2008 08:06:49 --  
Elapsed Time (s): 89; phi=-1.02, chi =0; dey =-43.85, spinz = -89.95;  
5 mm Pb + 3 mm Cu; coinc time = 1 us; thres=1.58