



High-energy Blazars: The End

Ezequiel J. Marchesini
OAS Bologna

The Past



June 2016: High-energy emitting blazars: Optical studies

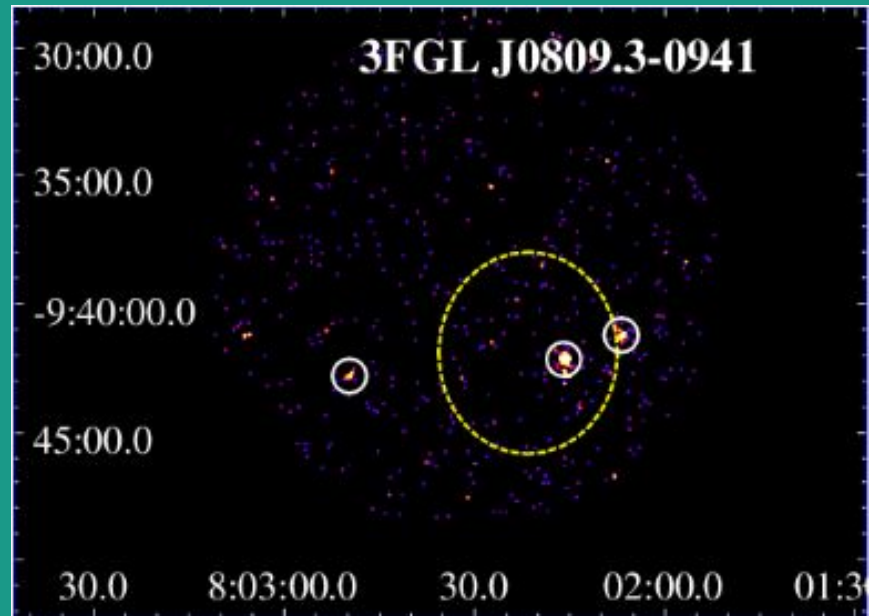
May 2017: X-raying the γ -ray sky (softly)

April 2019: X-raying the γ -ray sky: preliminary results

The Present

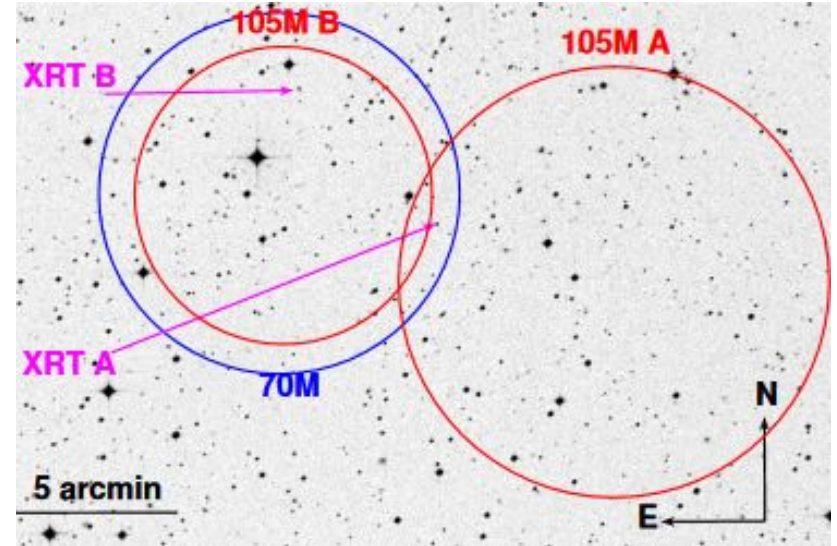
Fermi positional uncertainty: 6 arcmin (mean)

- ~30% sources in high-energies remain unidentified
- ~30% sources in high energies are blazars
- Is there any other method to find them?



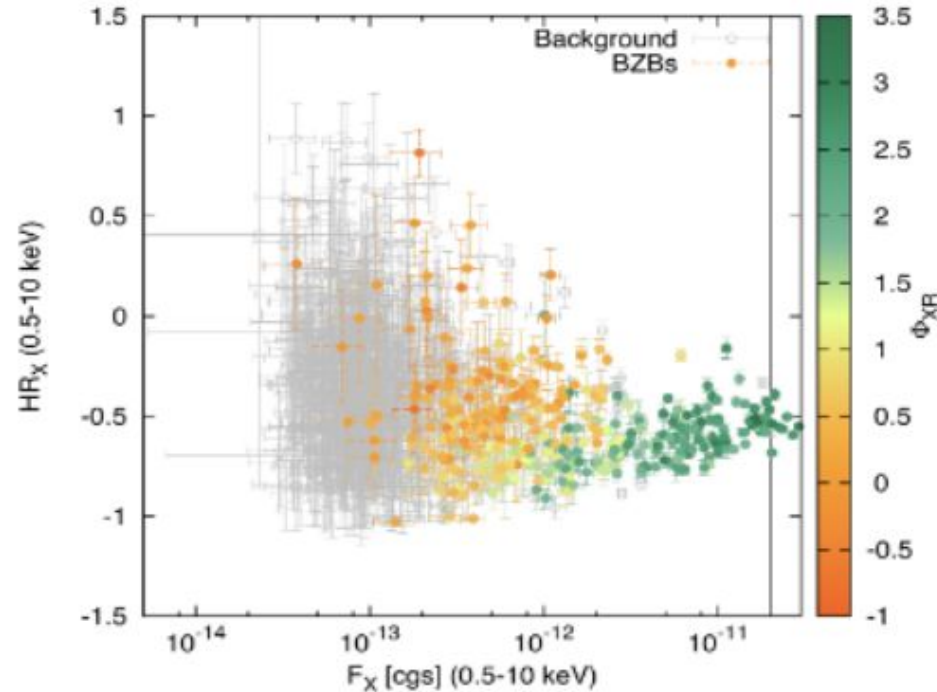
Step 1: Test a method

- Crossmatch γ -ray and X-ray positions
- Find optical counterparts to X-ray sources
- Identify the nature of the counterpart
- Is it a γ -ray emitting source?



Step 2: Calibrate it

- Automate the process
- Repeat on several already identified Fermi blazars
- Quantify the results
- Are there any correlations?



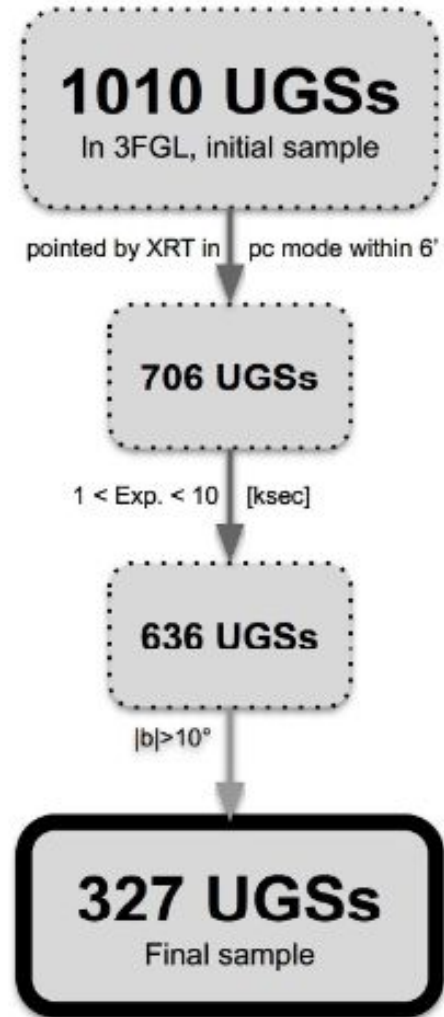
Step 3: Use it

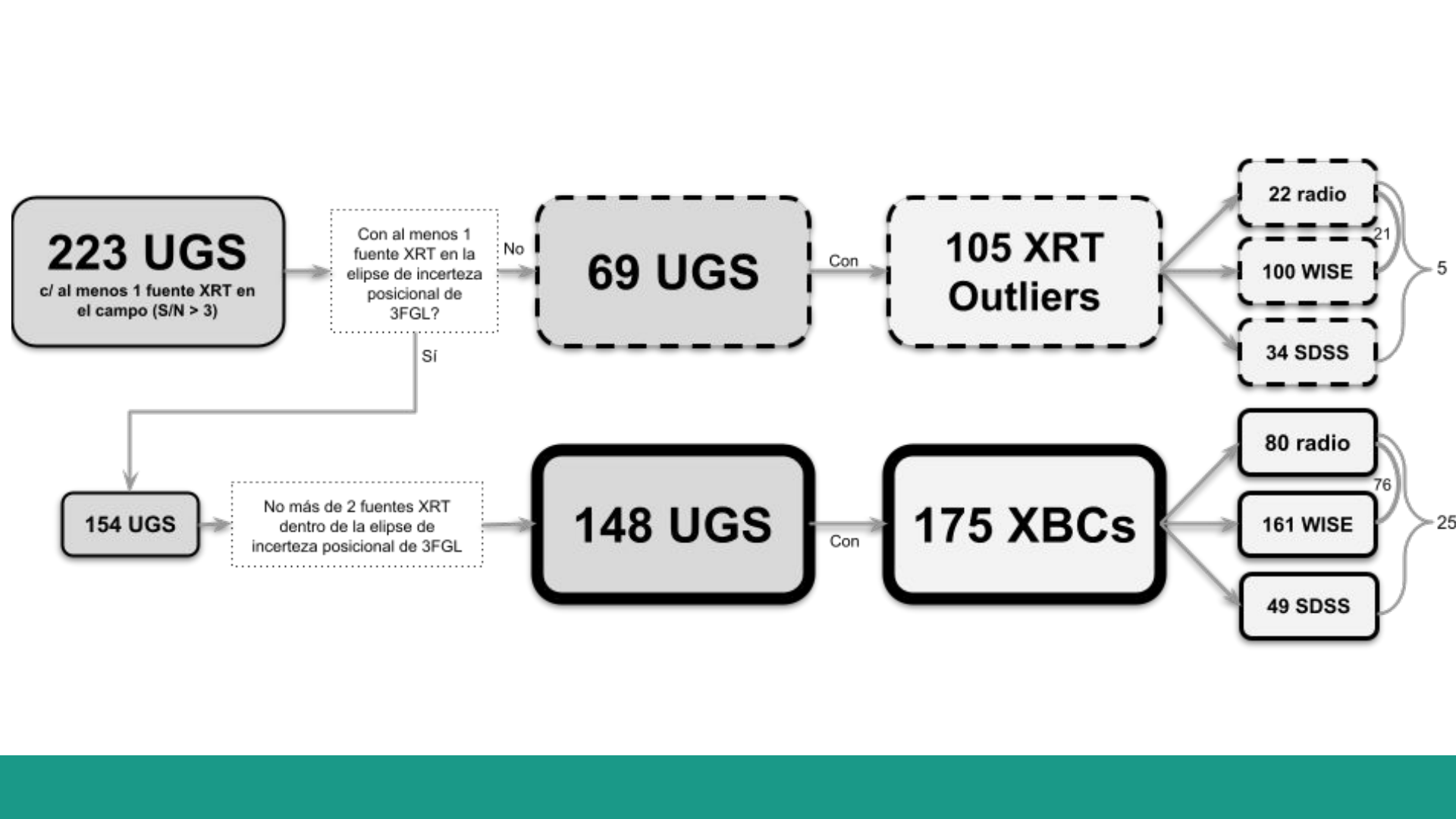


- Repeat on several unidentified Fermi sources
- Quantify the results
- Are there any blazar-like sources?



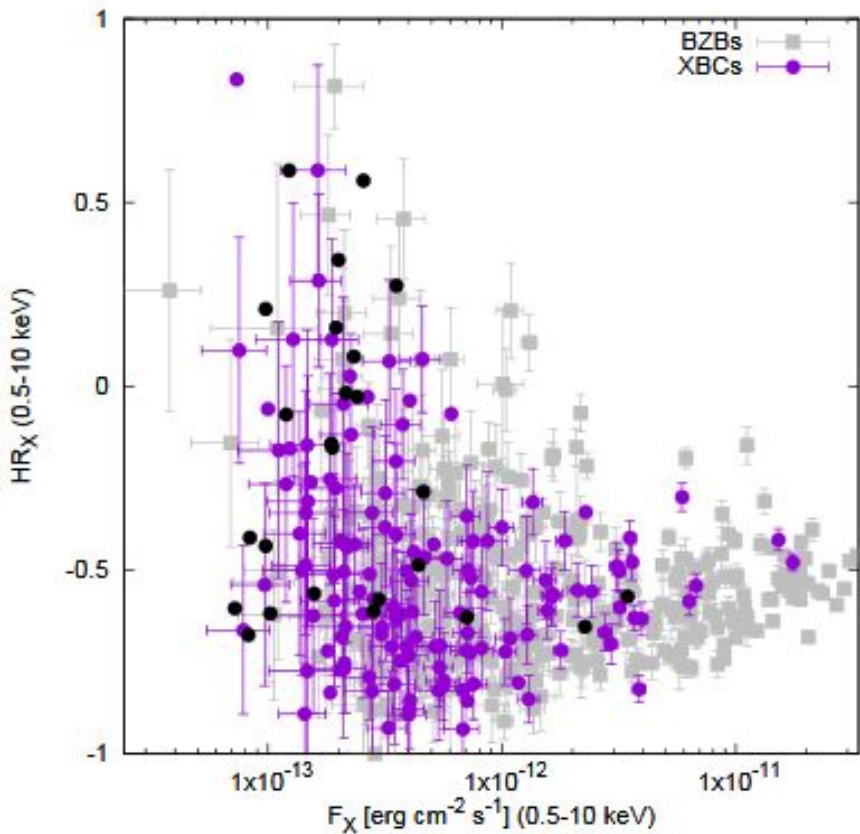
The γ -ray sky seen at X-ray energies II



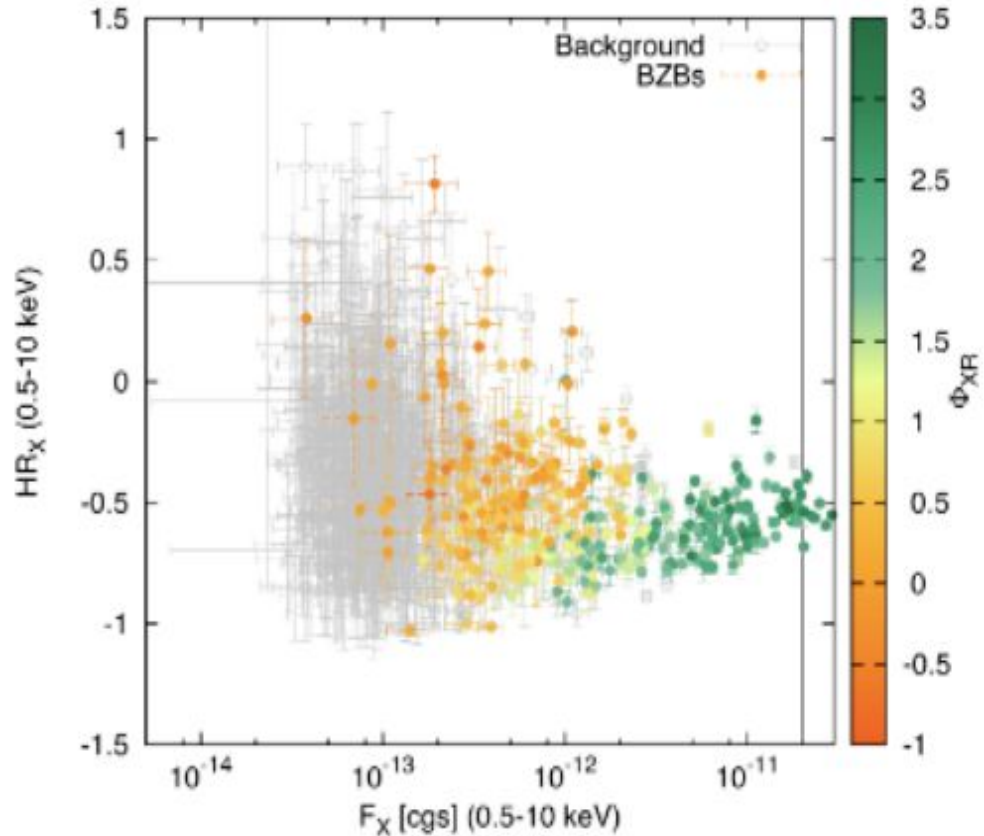


Do they look like Blazars?

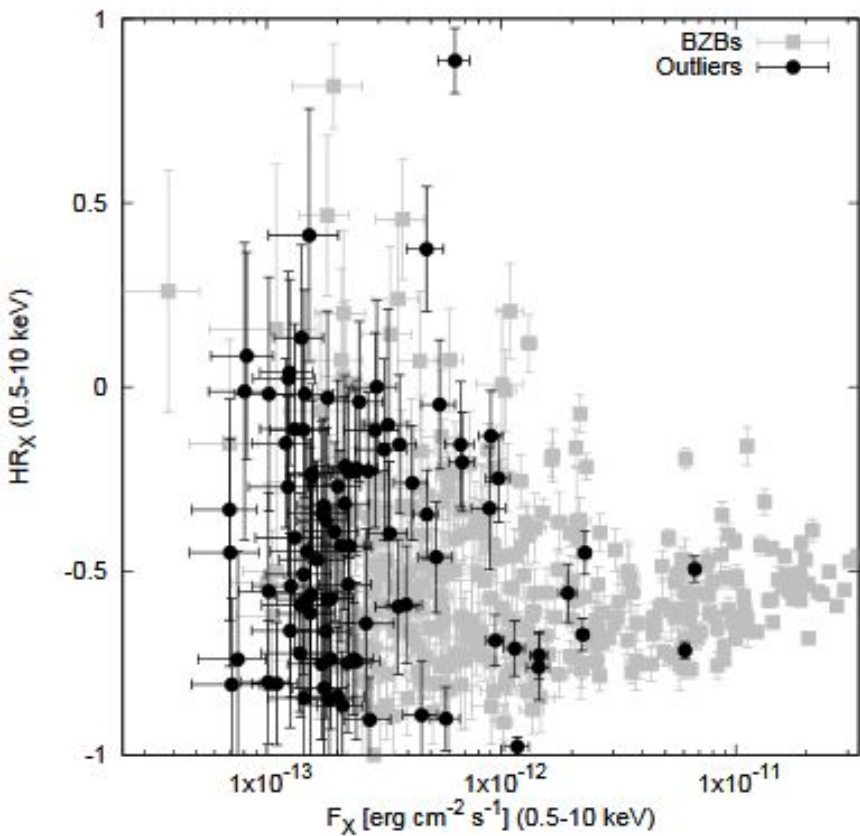
- F_x vs HR_x ?
- F_γ ?
- (U-R)?
- WISE colors?
- Radio detection?
- Optical spectrum?



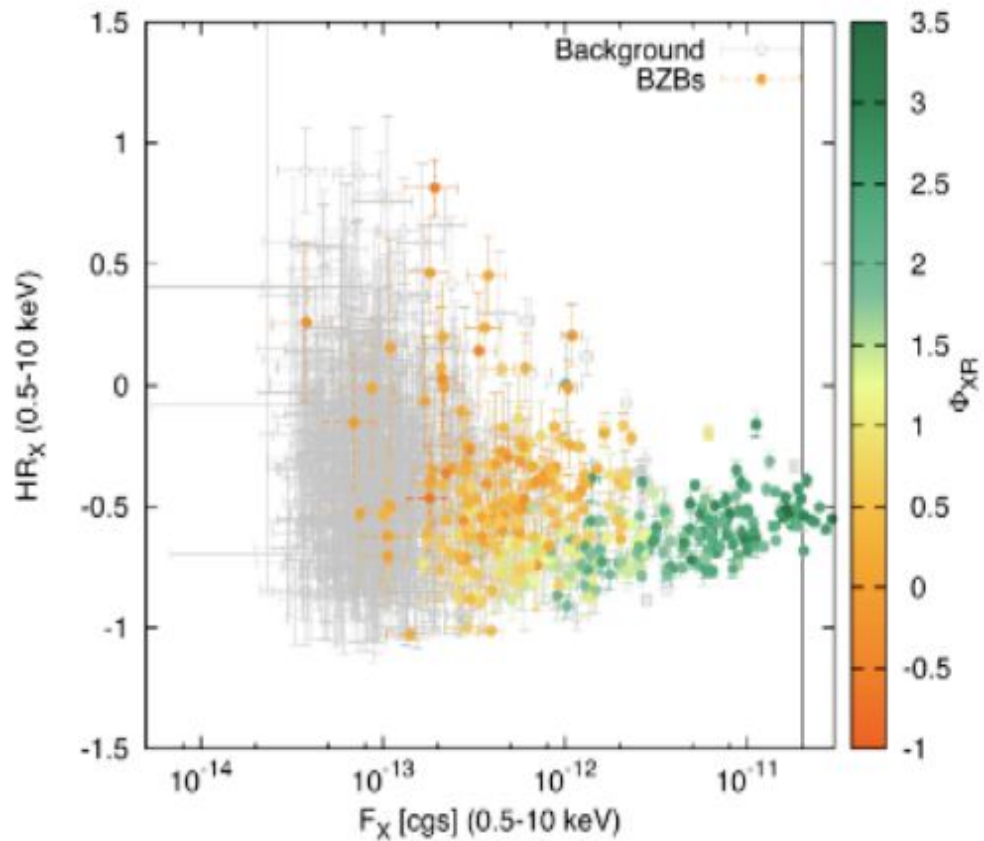
XBCs (singles and doubles)



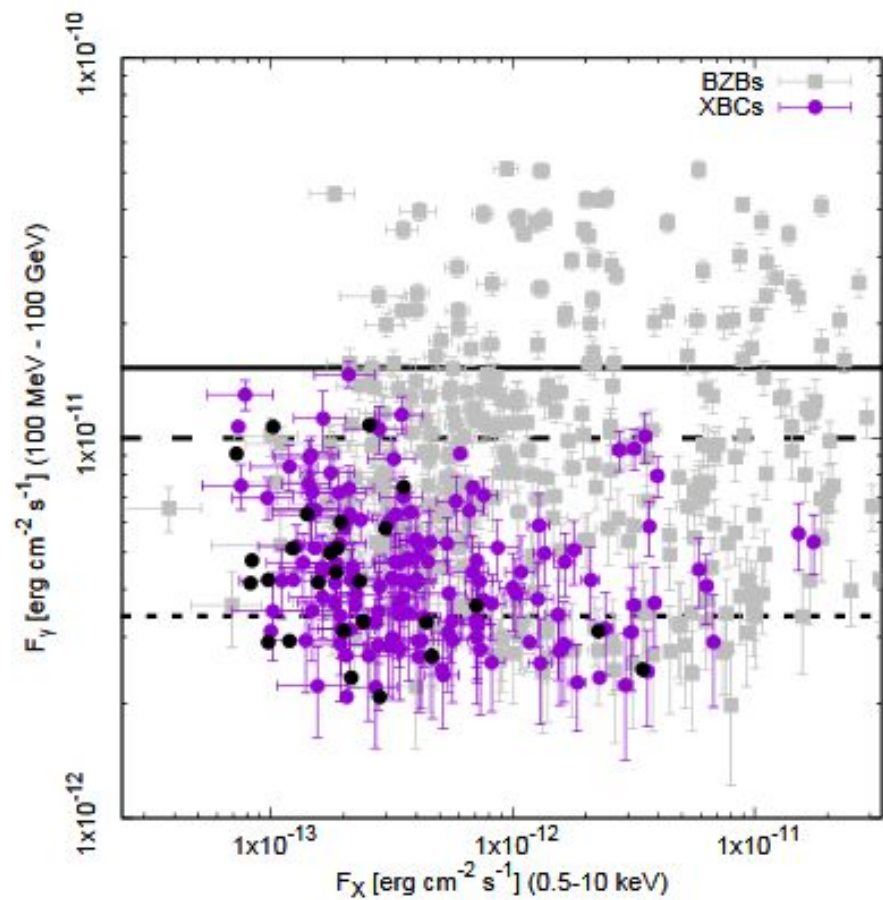
HBLs and LBLs



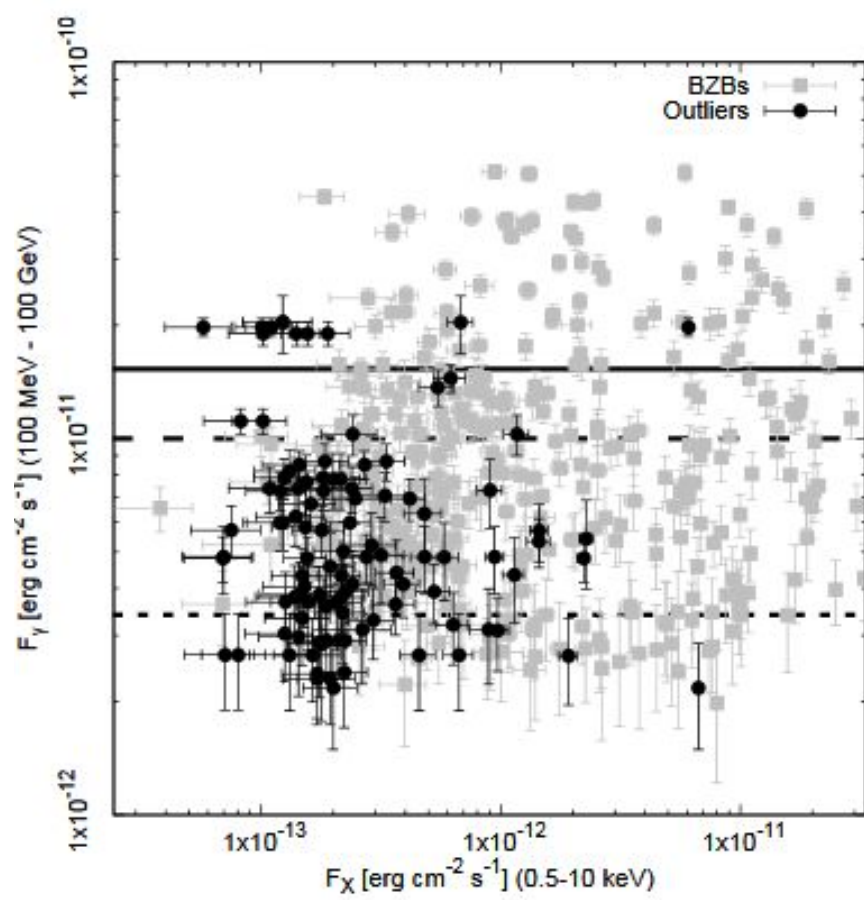
OUTs



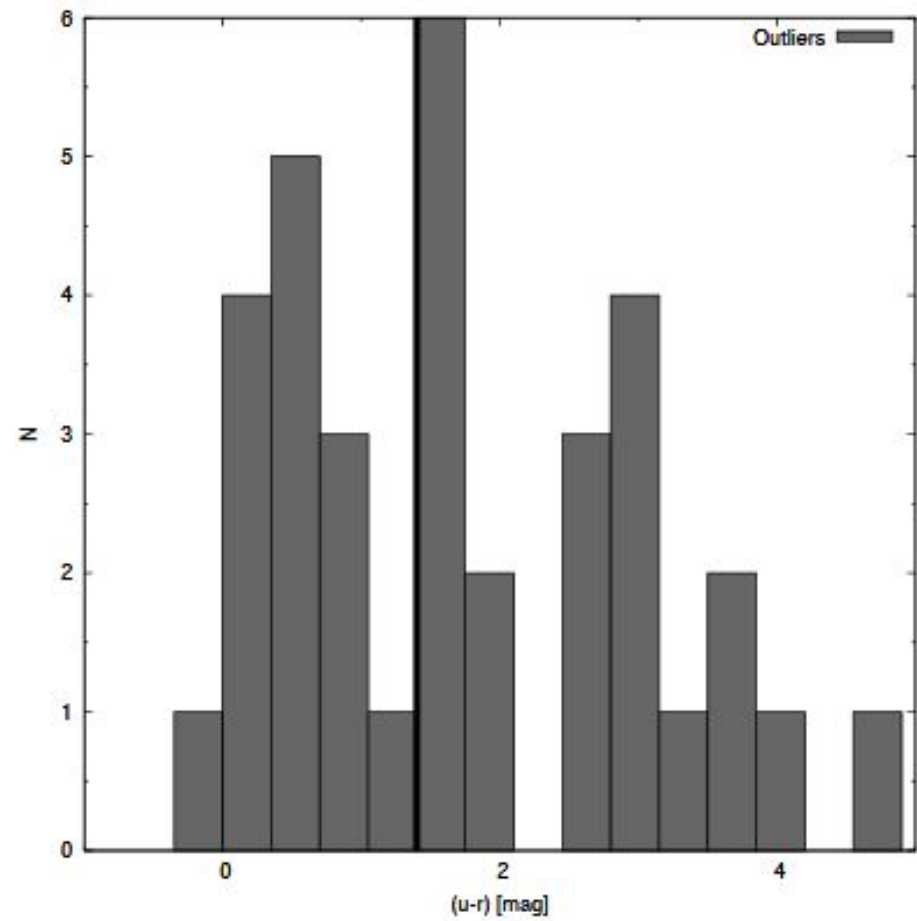
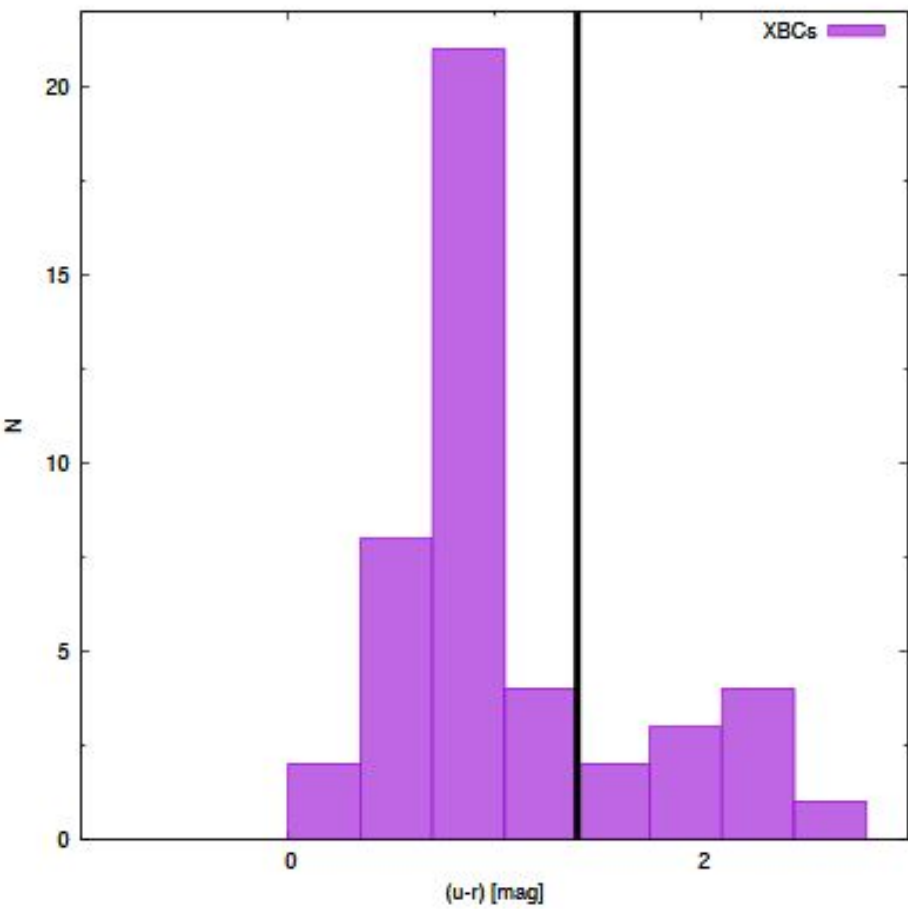
HBLs and LBLs



XBCs (single and doubles)

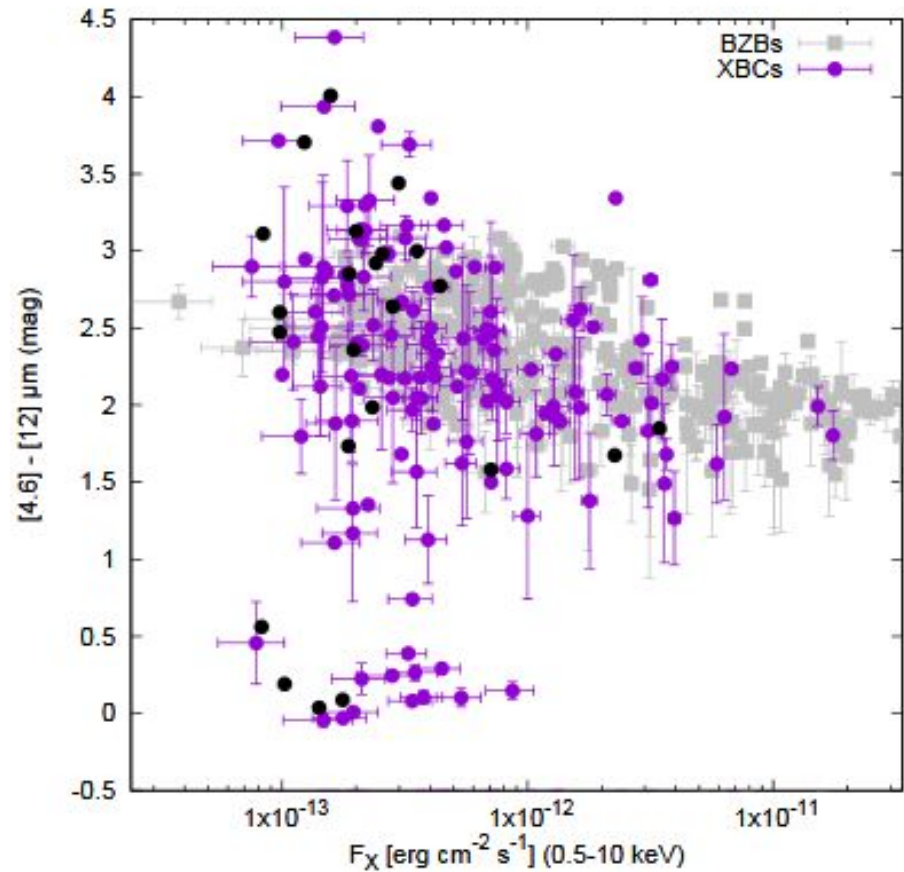


OUTs

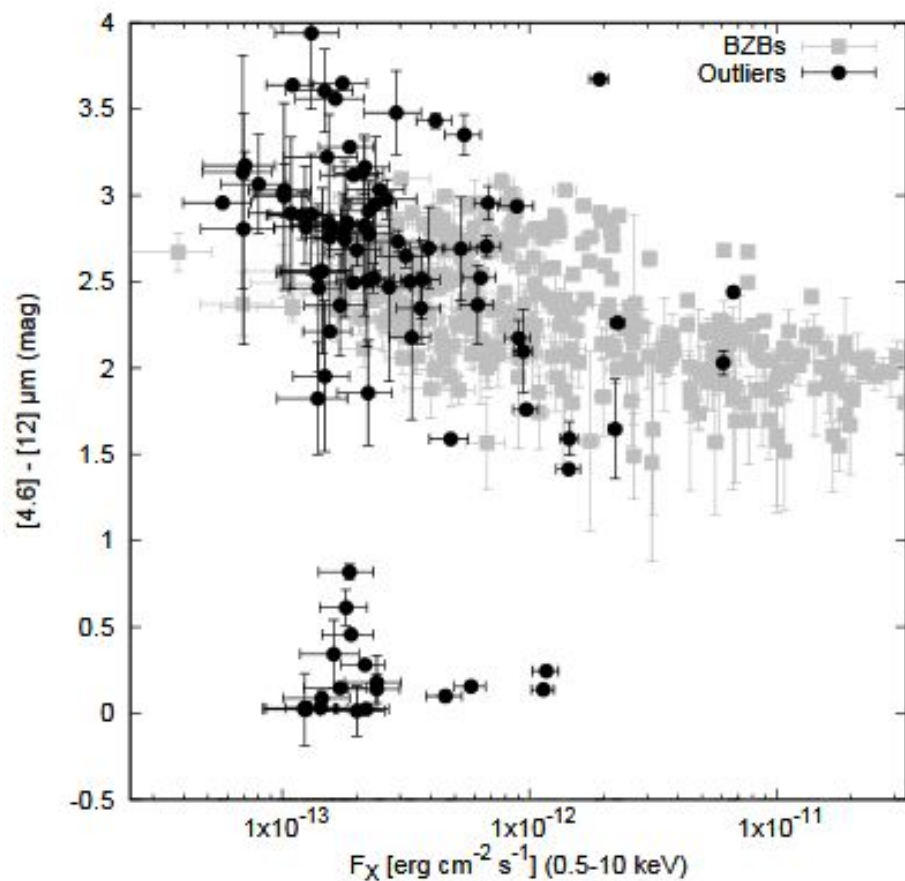


XBCs (single and doubles)

OUTs



XBCs (single and doubles)



OUTs

Radio detection:

80 XBCs

22 OUTs

NVSS (1.4 GHz)

and/or

SUMSS (843 MHz)

Optical identification:

50 XBCs:

- 45 BL Lac
- 2 FSRQ
- 3 Quasars

5 OUTs

- 1 BL Lac
- 2 FSRQ
- 2 Quasars

Firm candidates: Check 2 out of 3 boxes

- Radio* counterpart**
- Optical* counterpart w/ $(U-R) < 1.4$**
- Mid-IR* counterpart w/ blazar colors**

Firm candidates: Check α boxes

- Radio color
- Optical color
- Mid-IR counterpart w/ $(U-R) < 1.4$
- Mid-IR counterpart w/ blazar colors

**41 CANDIDATES WAITING
FOR CONFIRMATION!**




The Future

- Expand the sample: γ -rays
 - ◆ 4FGL incorporated +1300 new sources
- Expand the sample: X-rays, *the successors of Swift*
 - ◆ eROSITA
 - ◆ THESEUS



The Future

- Expand the sample: γ -rays
 - ◆ 4FGL incorporated + 1300 new sources
- Expand the sample: X-rays
 - ◆ *Swift*
 - ◆ eROSITA
 - ◆ THESEUS



XGIS: 2 keV to 20 MeV
+ FOV (SXI)
+ IRT



Now

- THESEUS Conference: 23-26 March 2021 (virtual). 400 participants, and **REGISTRATION STILL OPEN! :D**
- OAS Bologna - Claudio Labanti, Riccardo Campana, Fabio Fuschino, Enrico Virgilli (among others!)

Questions?

