Gli ammassi stellari nell'era di *Gaia* e delle grandi survey spettroscopiche

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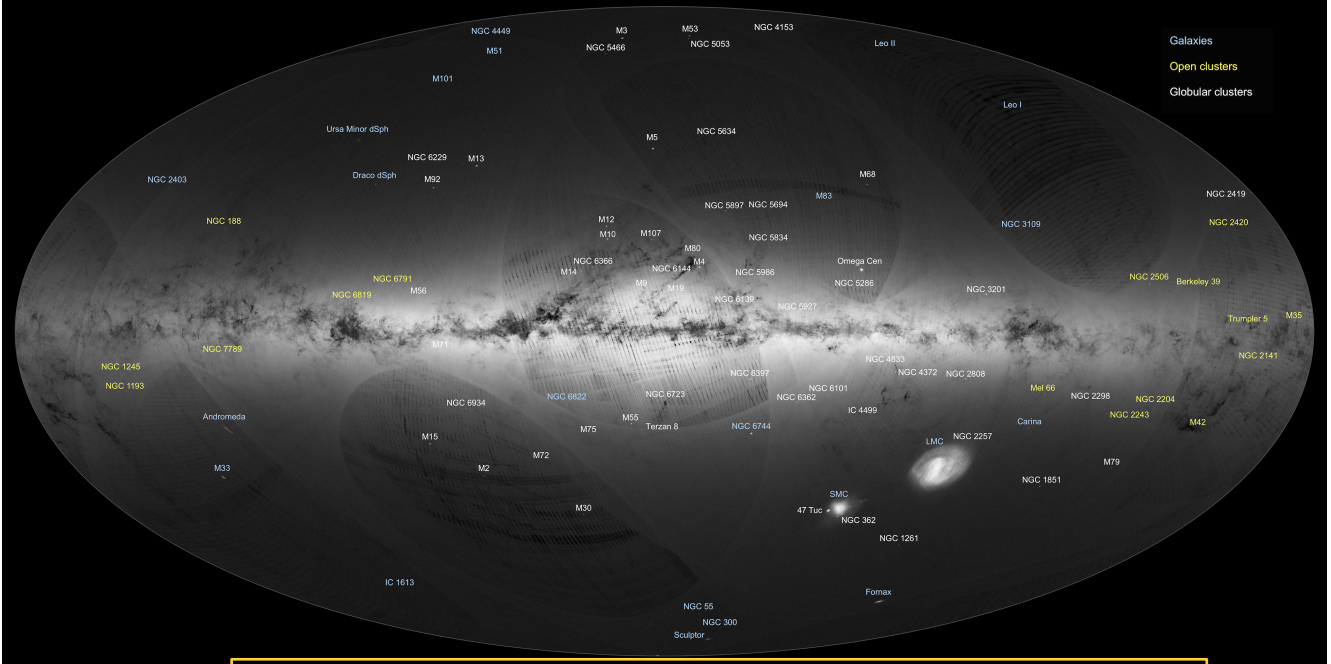
Gaia



Archeologia galattica

Gaia-ESO *(e altre)*

La missione *Gaia* ci dà:

- **posizioni**
- **parallasse**
- **moti propri**

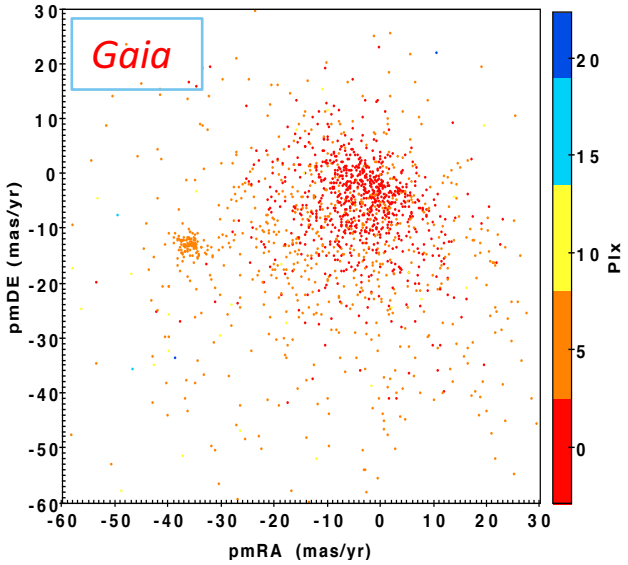
di > 1 miliardo di stelle (mag≤21) comprese quelle in ammassi stellari
+ velocita' radiali e informazione chimica limitate per alcuni milioni

Survey da Terra (come Gaia-ESO al VLT con FLAMES; o APOGEE in IR; o WEAVE nel prossimo futuro) danno, per qualche milione di stelle e con alta precisione:

- **velocità radiale**
- **metallicità**
- **abbondanze chimiche**

➔ *Gaia* + spettroscopia

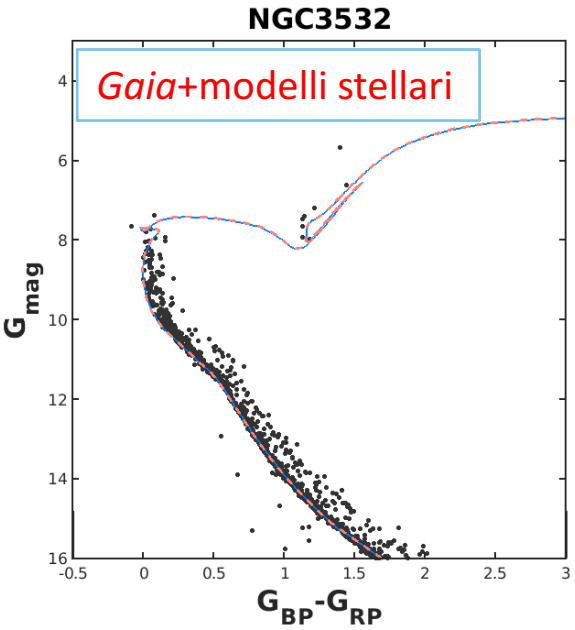
Gaia + spettroscopia = conosciamo i nostri ammassi, conosciamo la nostra Galassia

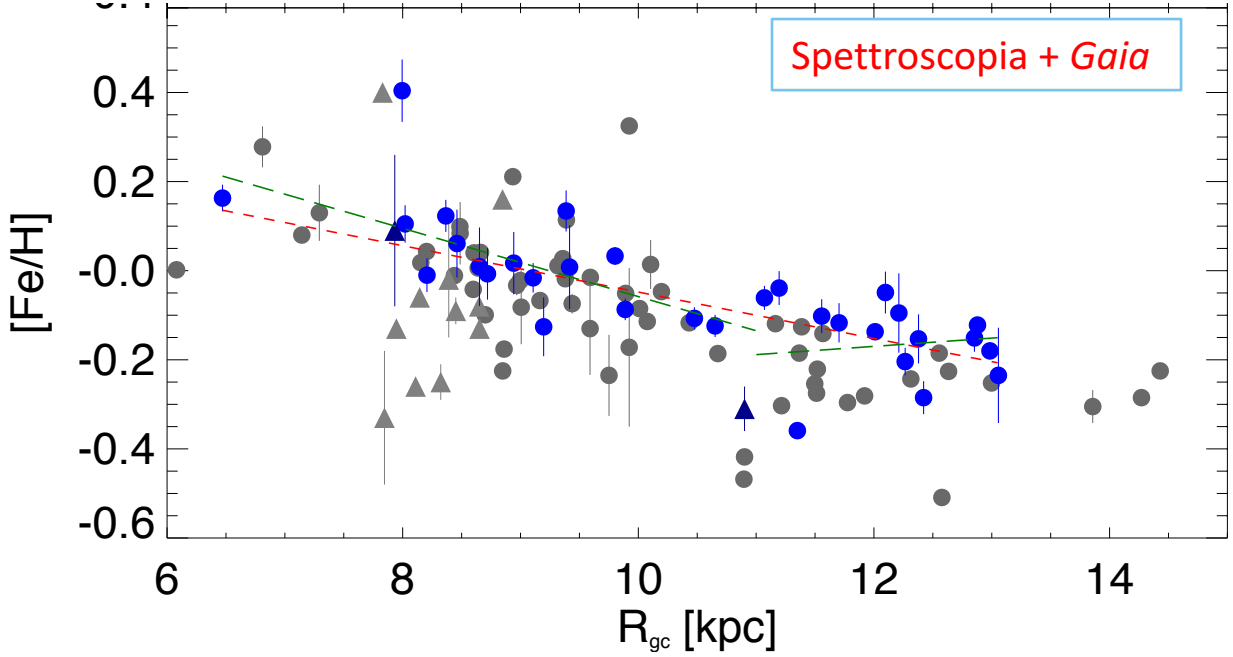


- PM,π + RV : membri,cinematica interna, distanza
- CMD + isocrone : eta'
- Spettri : chimica ([Fe/H], [el/Fe], [el1/el2]

➔ Ammassi come traccianti del disco (AA) e dell'alone (AG)

➔ Ammassi come test modelli stellari





Stellar clusters in the era of *Gaia* and large spectroscopic surveys :

Stellar clusters are important constituents and tracers of the galactic structure. They reside in the halo (the globular clusters), in the bulge and in the disk (where we see predominantly open clusters). They must have contributed to the field stars population, since most stars form in associations and clusters which later dissolve, dispersing their constituents. Stellar clusters are also the ideal site where to test the stellar evolutionary models, which are the best way to derive ages, on whose accuracy ultimately rests most of our understanding of galaxy evolution.

The *Gaia* mission (https://www.cosmos.esa.int/web/gaia/) is building a map of the Milky Way in 5+ dimensions and is Complemented by photometric and spectroscopic works from the ground (e.g. *Gaia*-ESO survey at ESO-VLT, APOGEE, the large program SPA at the TNG, etc). The full exploitation of *Gaia* to describe our Galaxy requires a precise and homogeneous analysis of the stellar clusters.

Possible thesis subjects are:

a) Using open clusters as test of evolutionary models (chemical properties and/or HRD+isochrones);

b) Finding dispersed clusters stars using chemical and dynamical tagging;

c) Globular clusters and the link between their chemistry and halo stars;

and **more**, to be discussed with the student. Familiarization with data mining and the use of large datasets (*Gaia* DR2, *Gaia*-ESO, GALAH, APOGEE, etc) and private data are common features of all projects.

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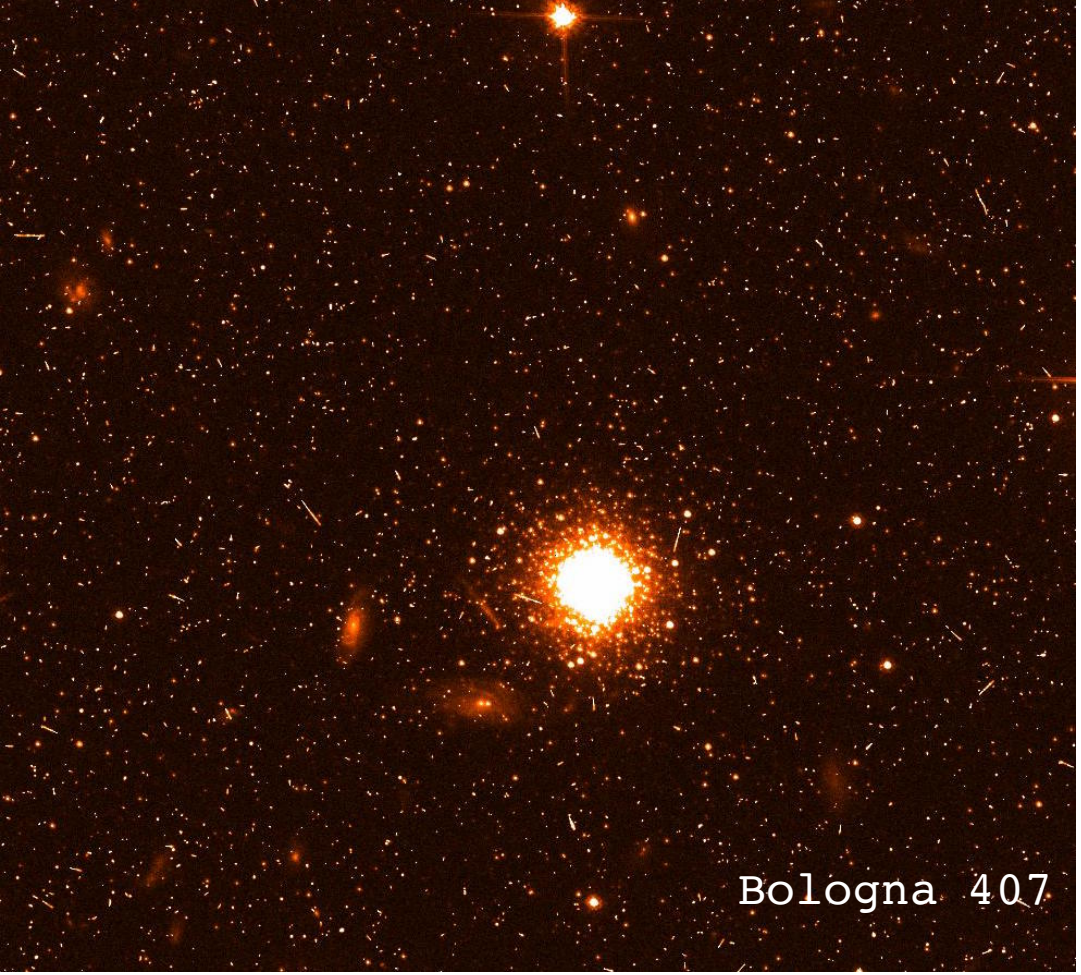
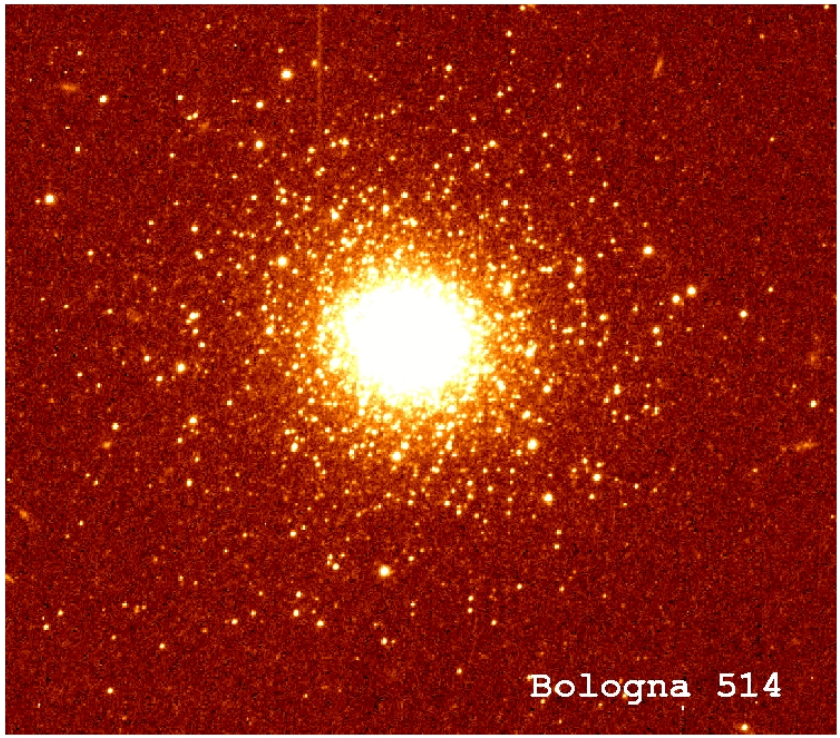
Articoli di approfondimento : vedi lista su
https://docs.google.com/document/d/1Zef7lQVu0jAhfLpH0EmtiFBPxk1uOChSEw_VZBxyYhE/edit?usp=sharing


Bologna 407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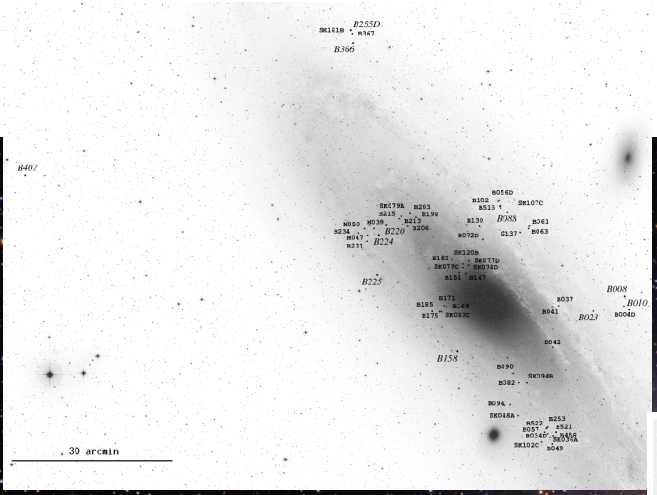
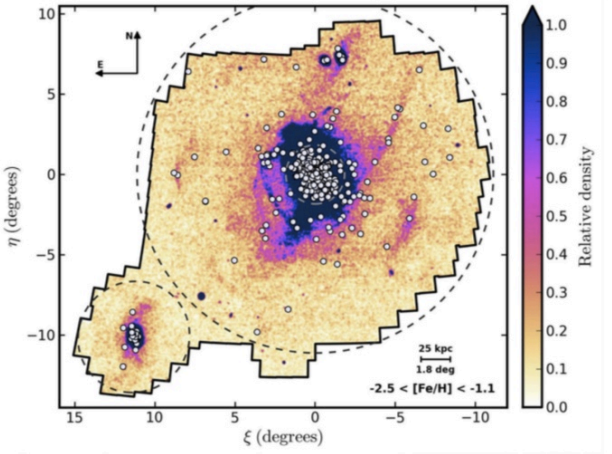
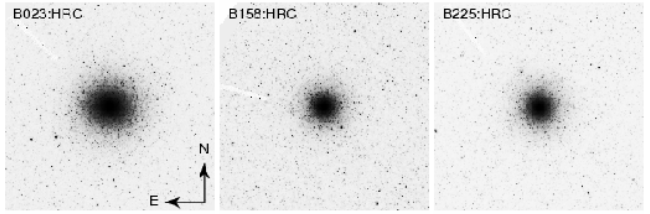
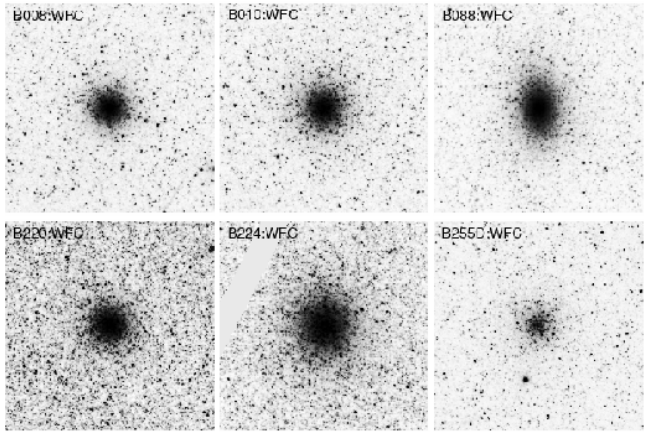
The Revised Bologna Catalog of M31 Globular Clusters & Gaia

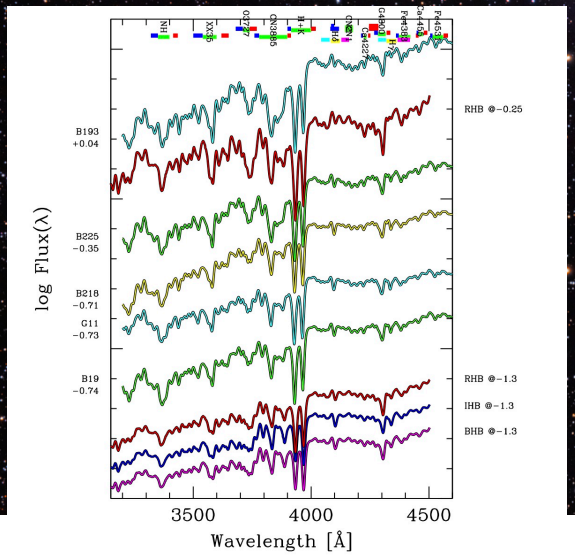


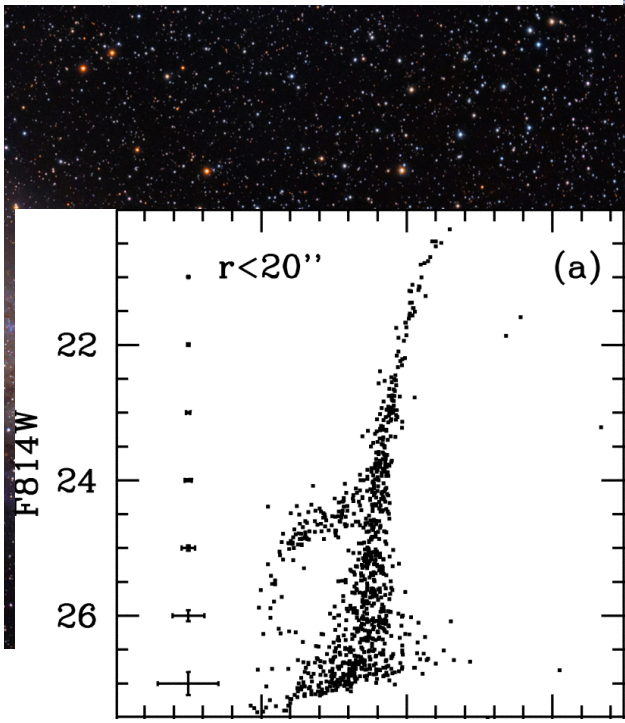






HST





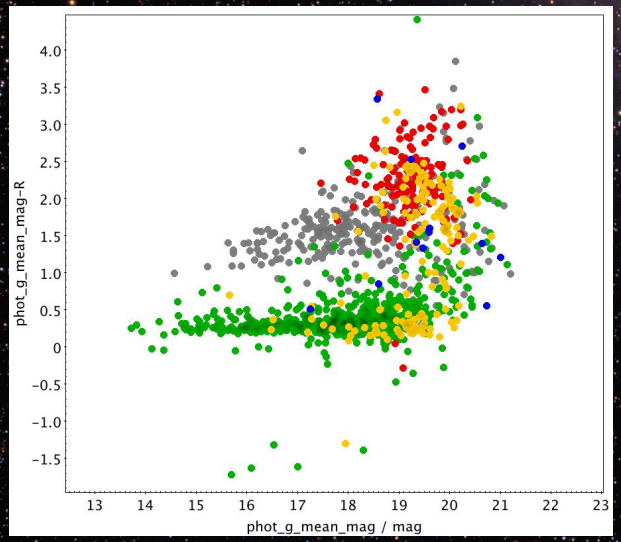
The Revised Bologna Catalog of M31 Globular Clusters & Gaia

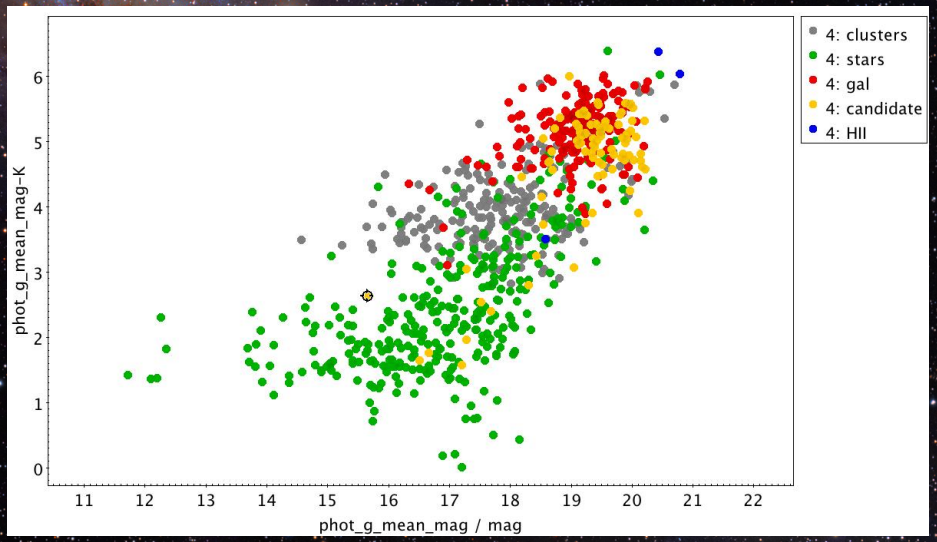
RBC is a worldwide reference. The site: ~600 contacts/year since 2004
The re-foundation paper (Galleti et al. 2004): ~10-20 citations per year

RBC contains 2000 entries, 625 confirmed clusters, hundreds of candidates to be confirmed

Gaia color can provide a new and powerful classification tool

An opportunity to keep the RBC up to date / an opportunity to play with the Gaia dataset





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