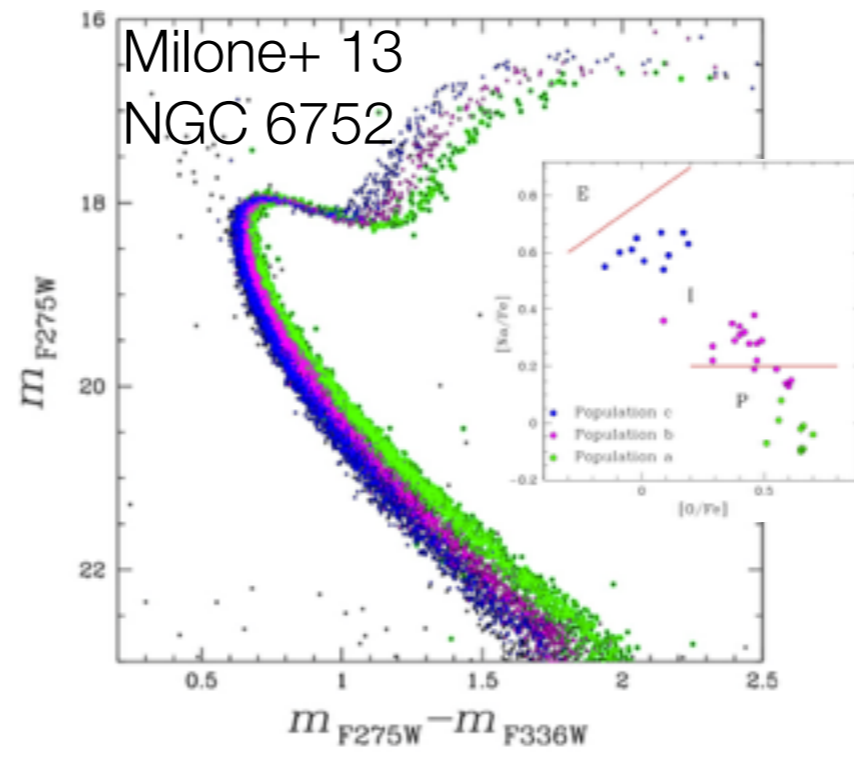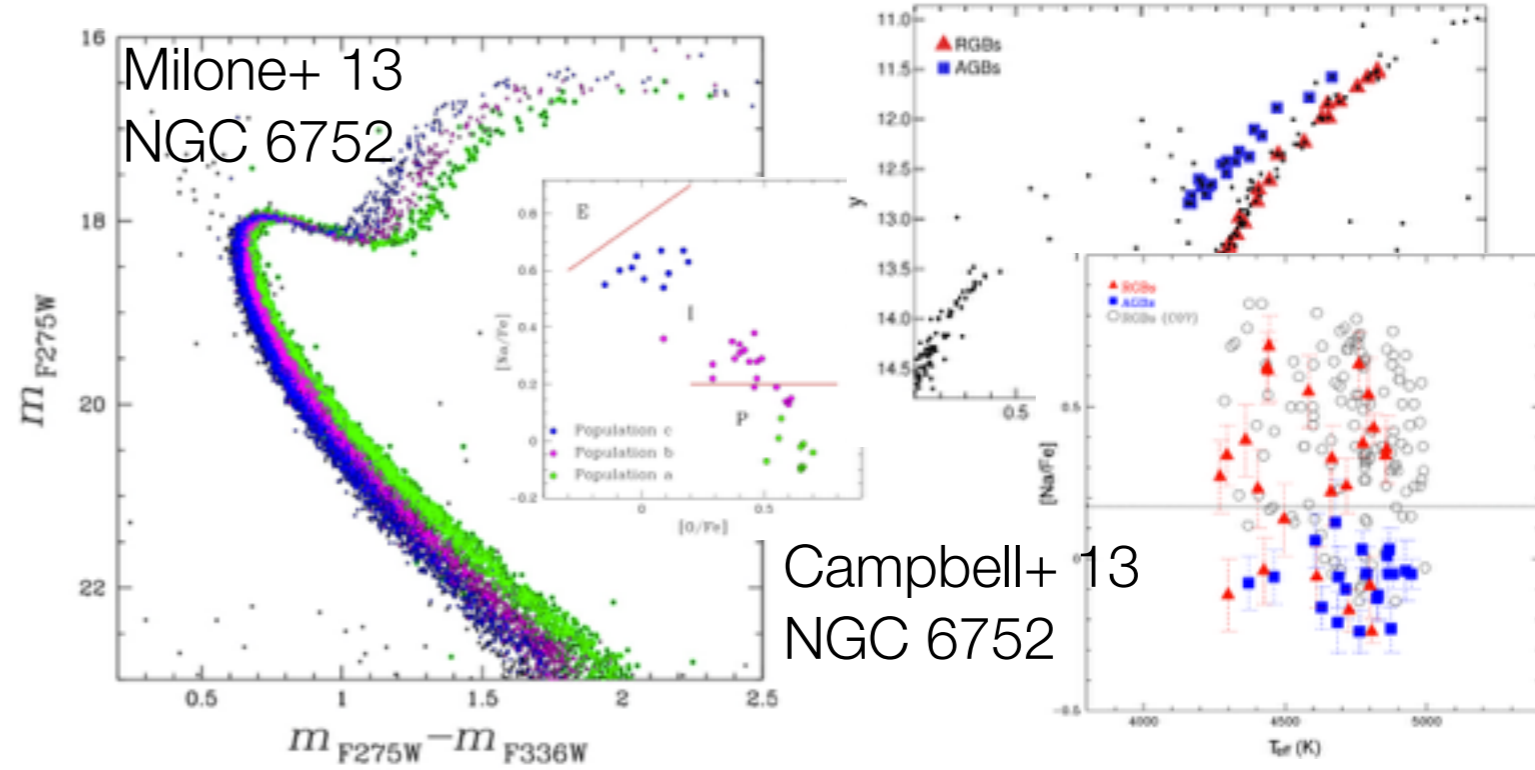# Chemical properties of AGB stars in GCs

I. Cabrera-Ziri, W. Chantereau, I. Claydon, R. Cohen, B. Dias, L. Grossler, I. Jean-Baptiste, G. Nandakumar, M. Powalka

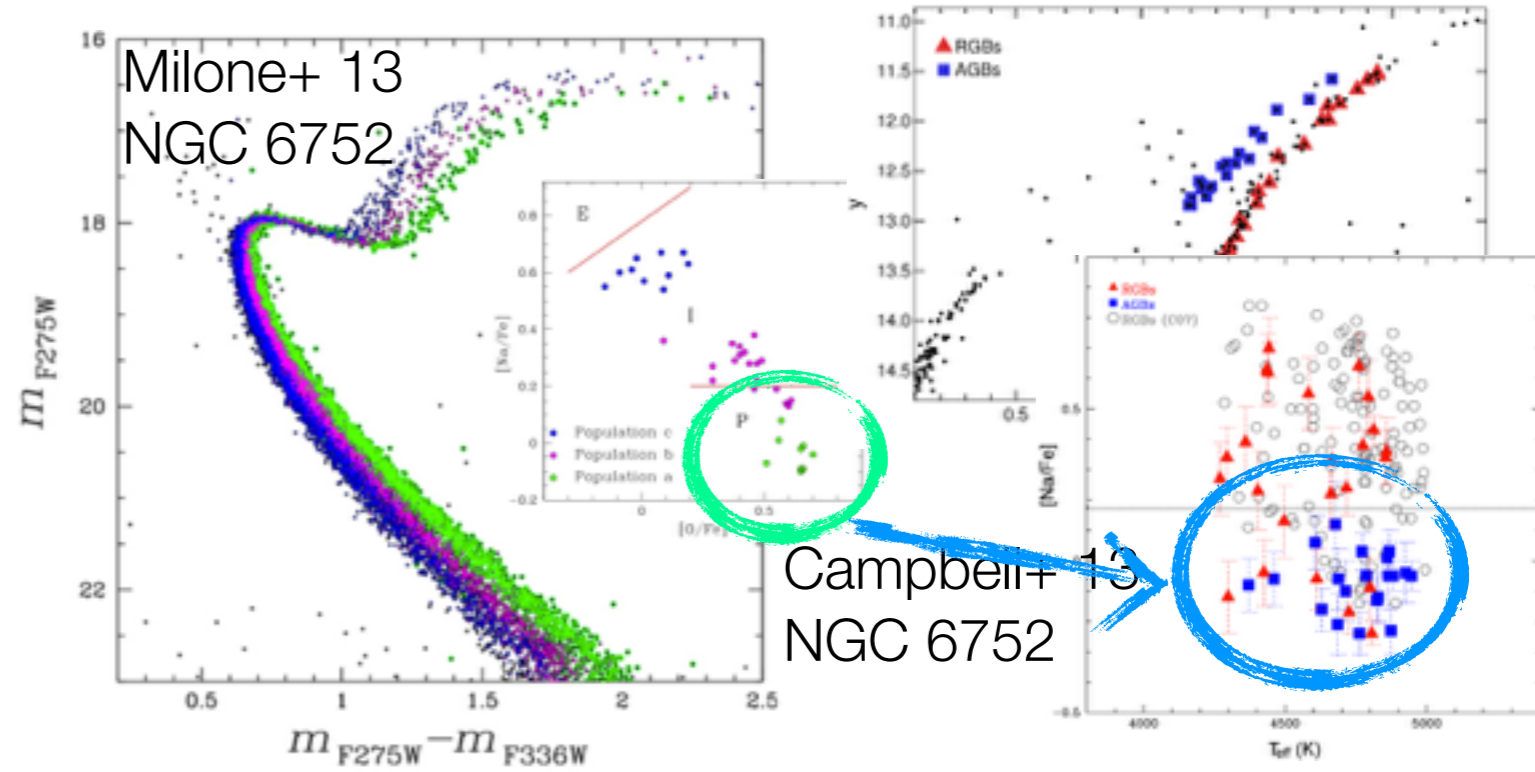Multiple stellar populations (MP) have been found in all evolutionary phases of GCs (e.g. from MS to HB).

Milone+ 13
NGC 6752

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The AGBs of some GCs seems to be missing the enriched pop., **i.e. 70% of the GC stars!!!**.

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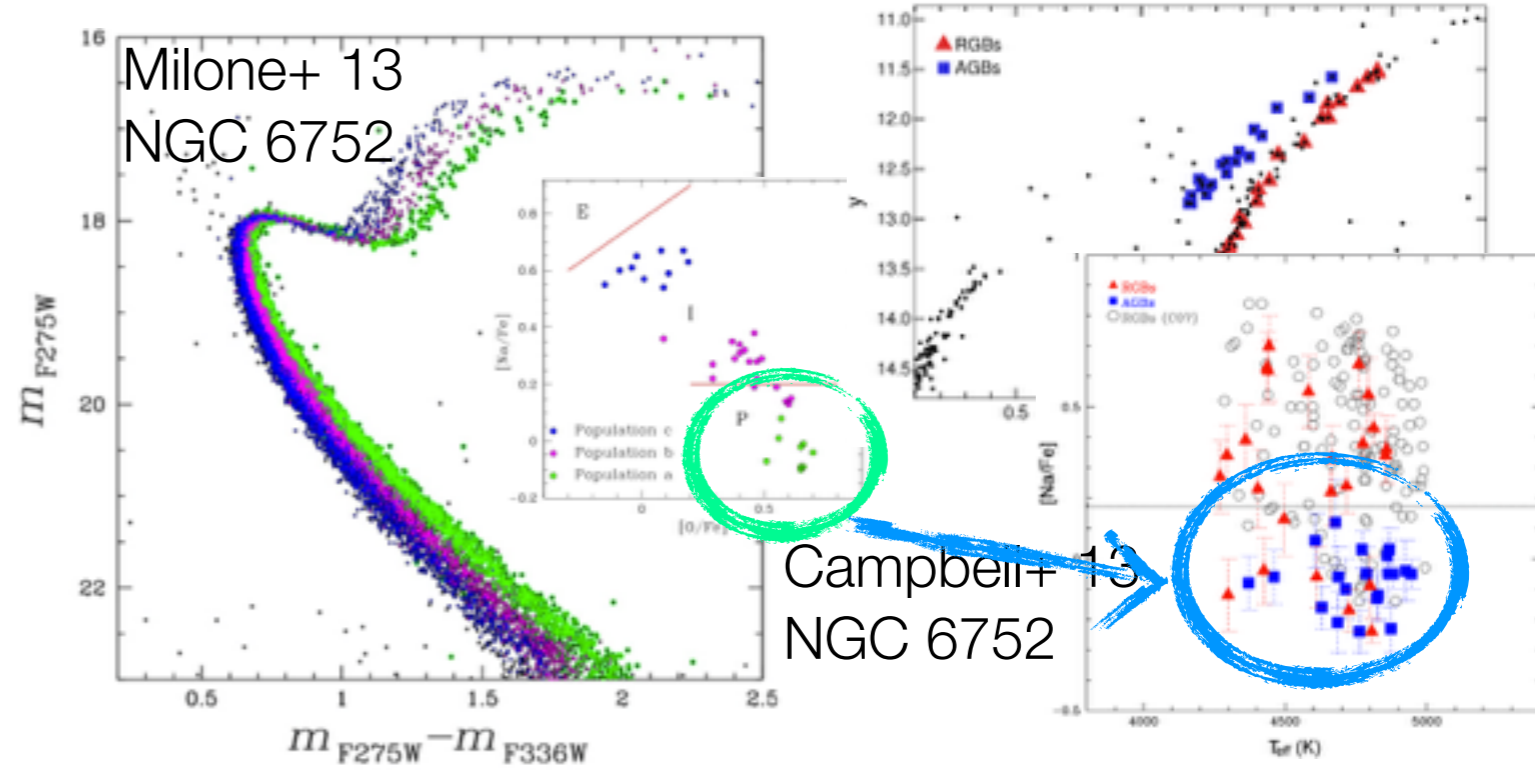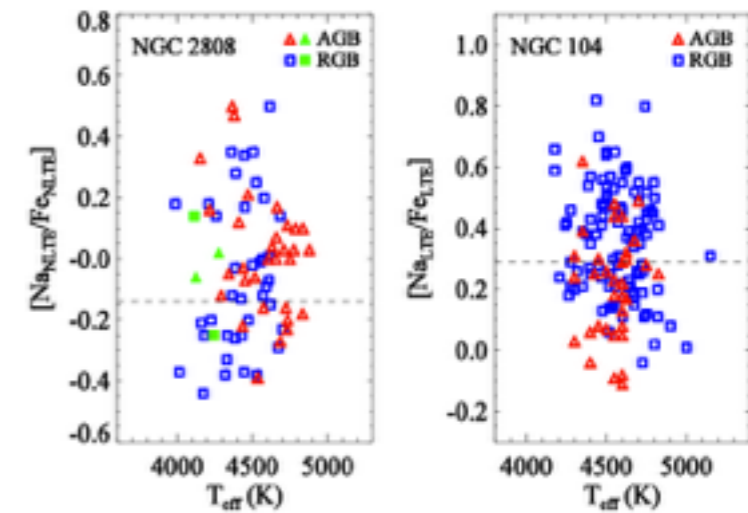(e.g. from MS to HB).

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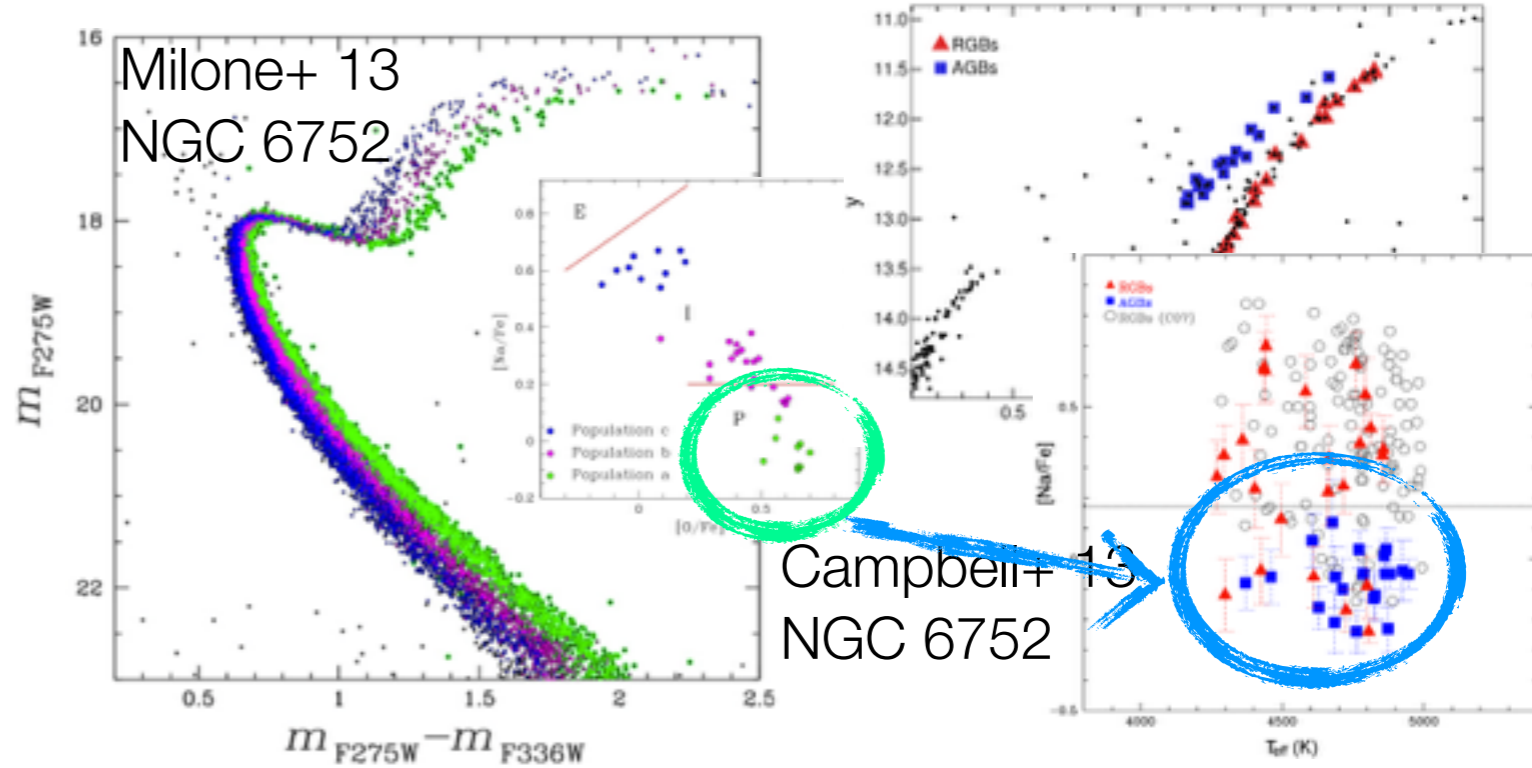

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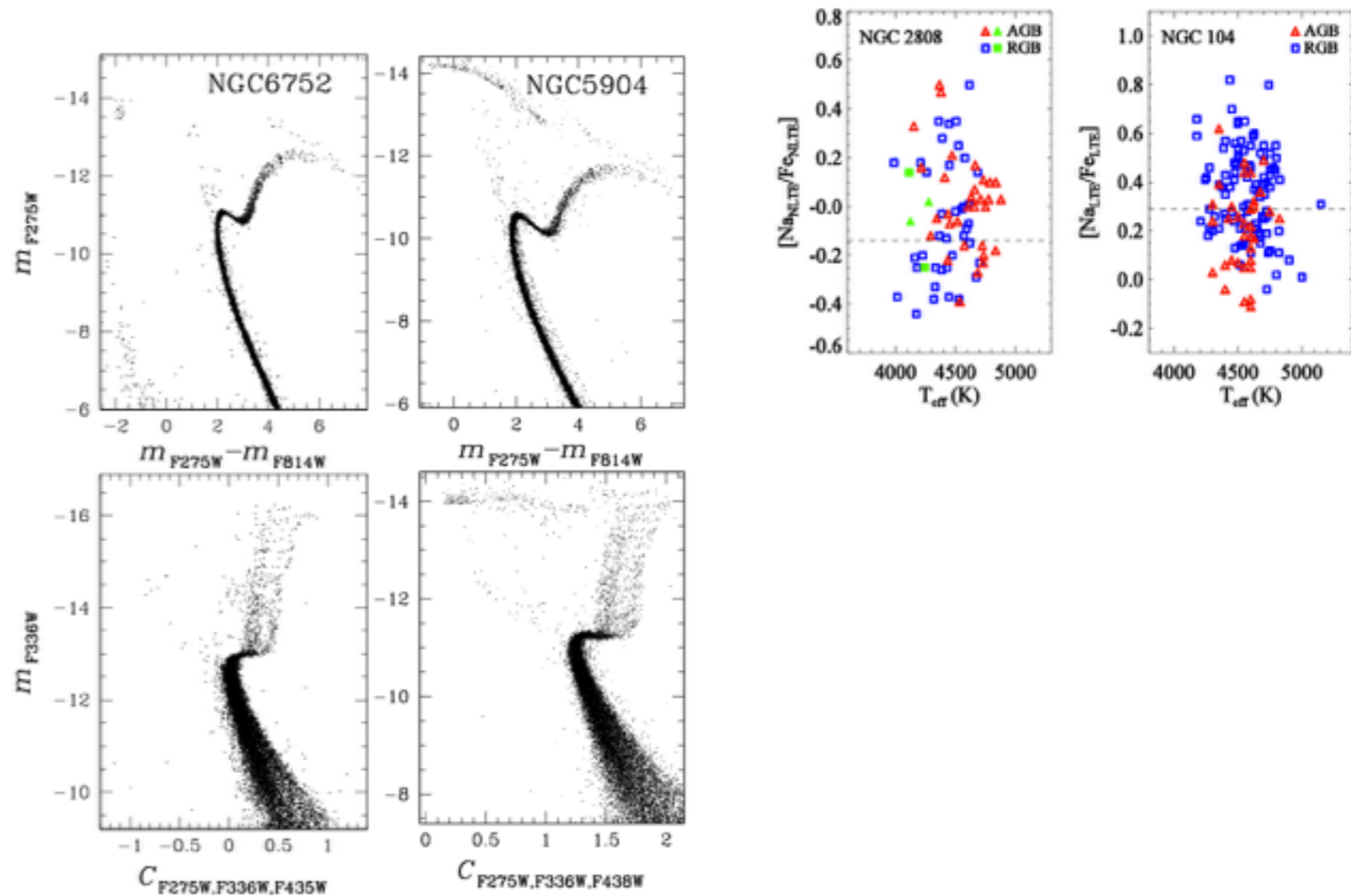AGB: **NO** CN-strong pop. (Norris+ 81) & **NO** Na rich pop.

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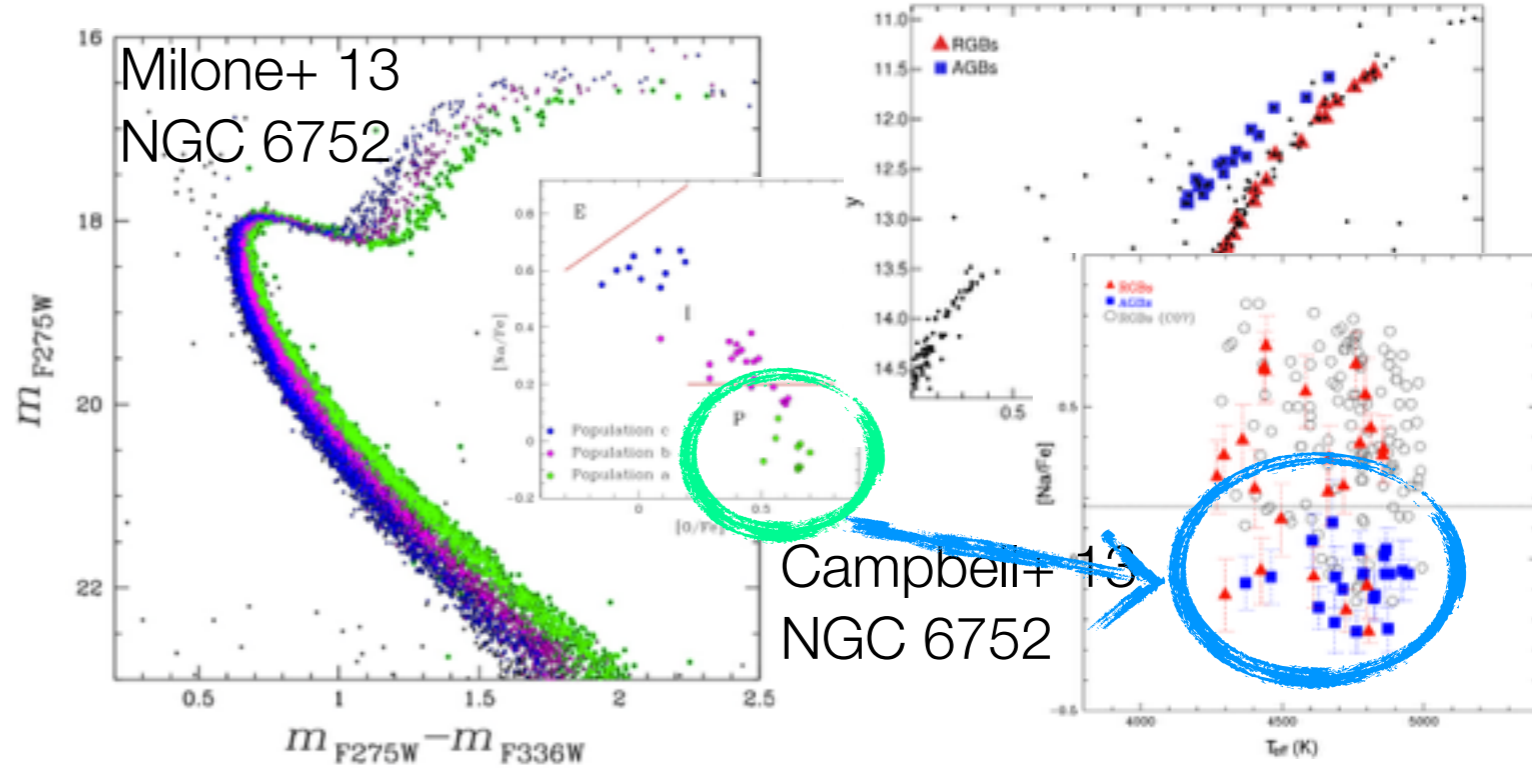
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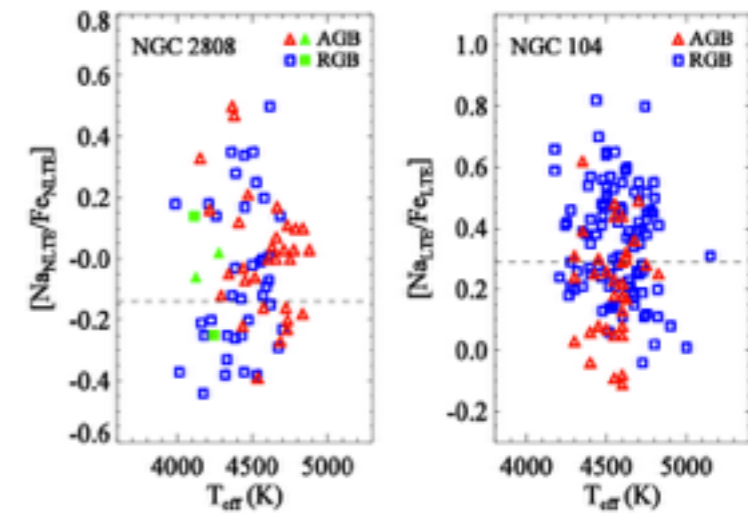AGB: **NO** CN-strong pop. (Norris+ 81) & **NO** Na rich pop.

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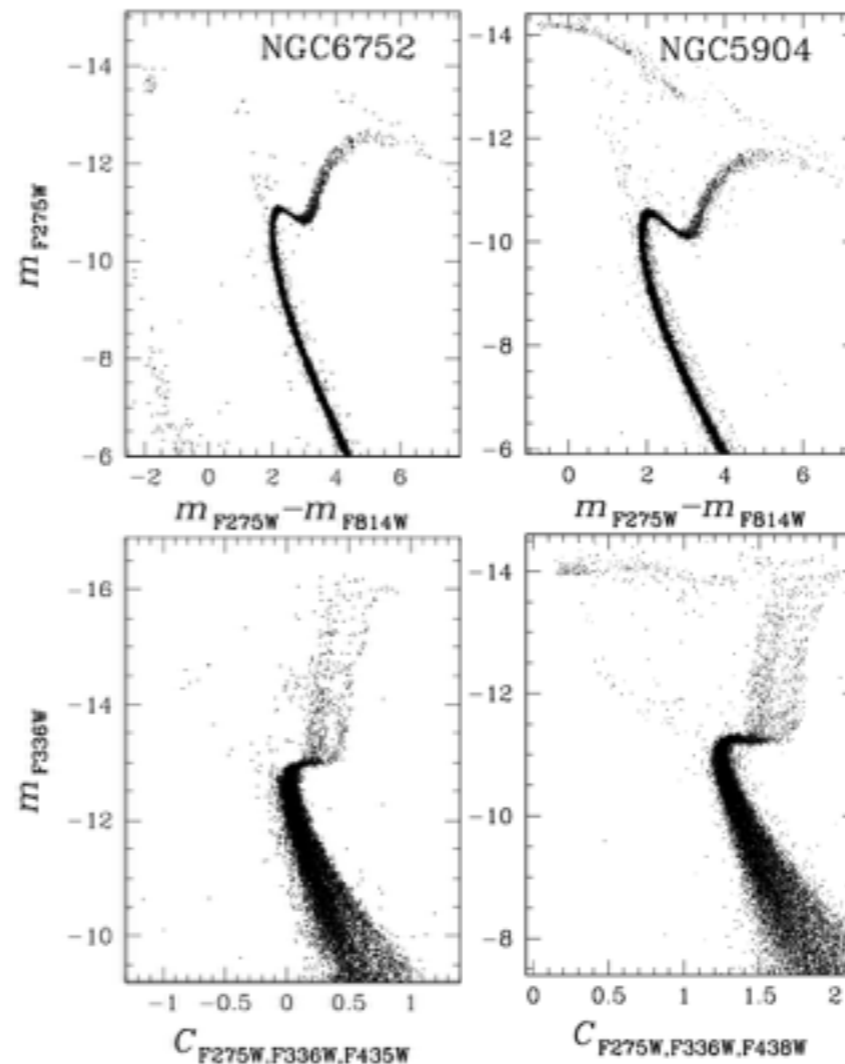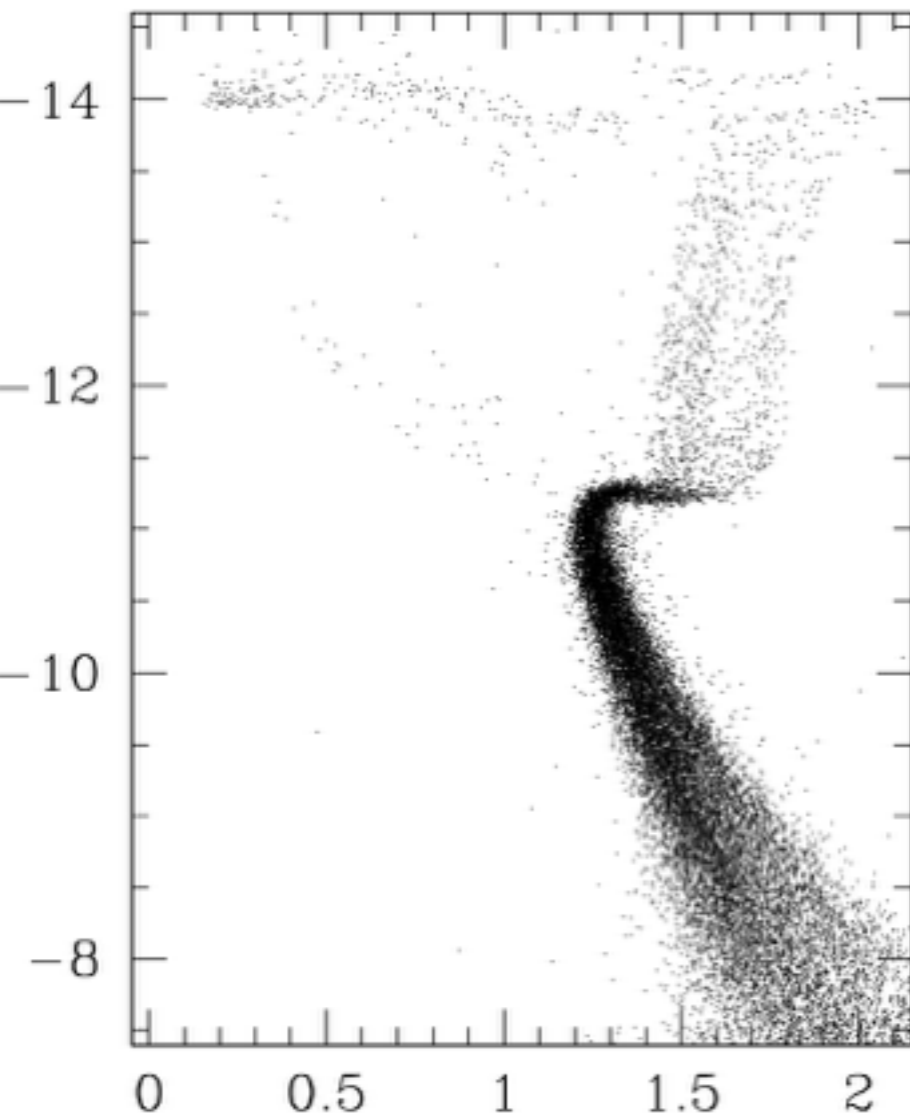AGB: **NO** CN-strong pop. (Norris+ 81) & **NO** Na rich pop.

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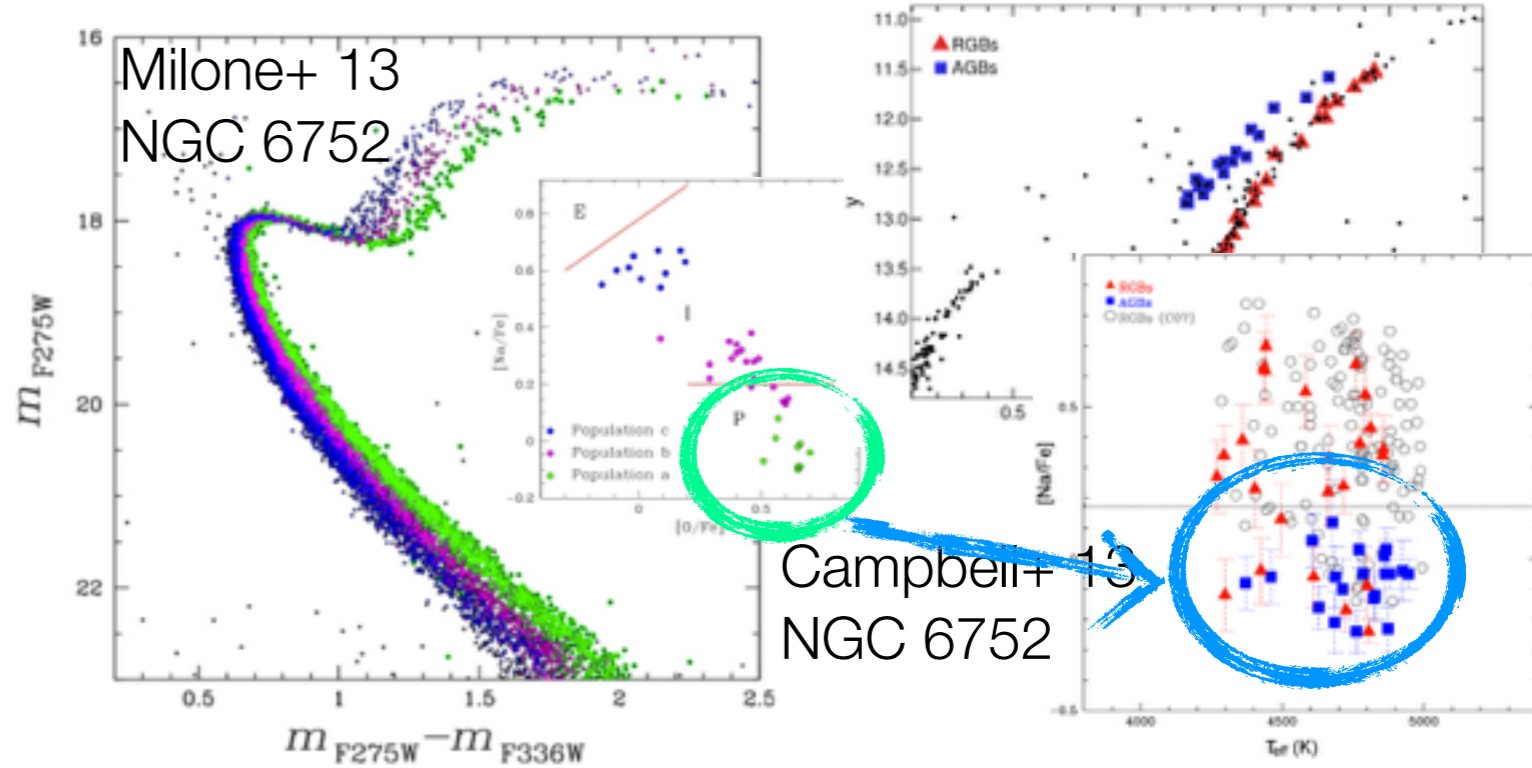

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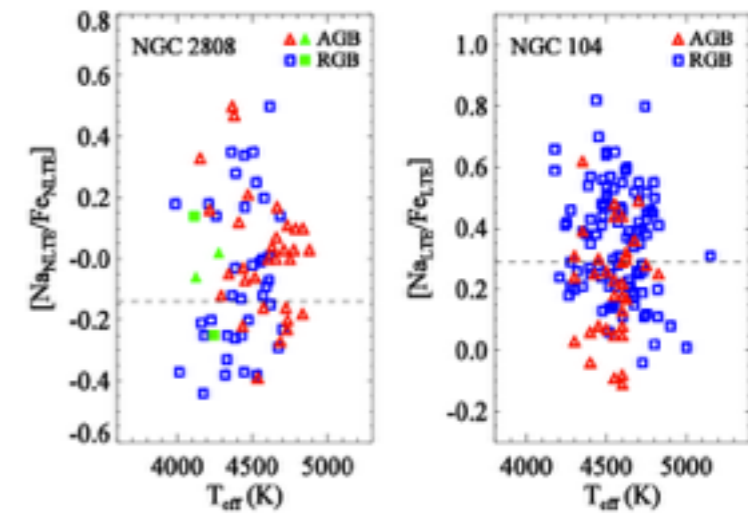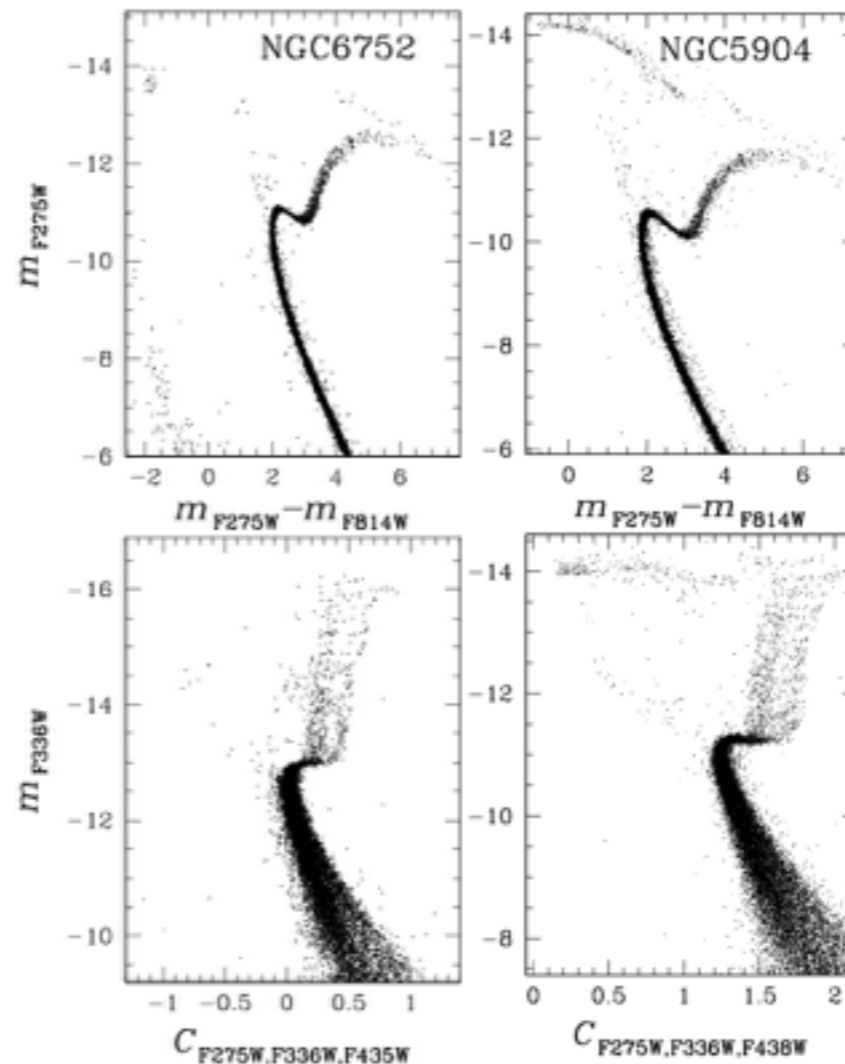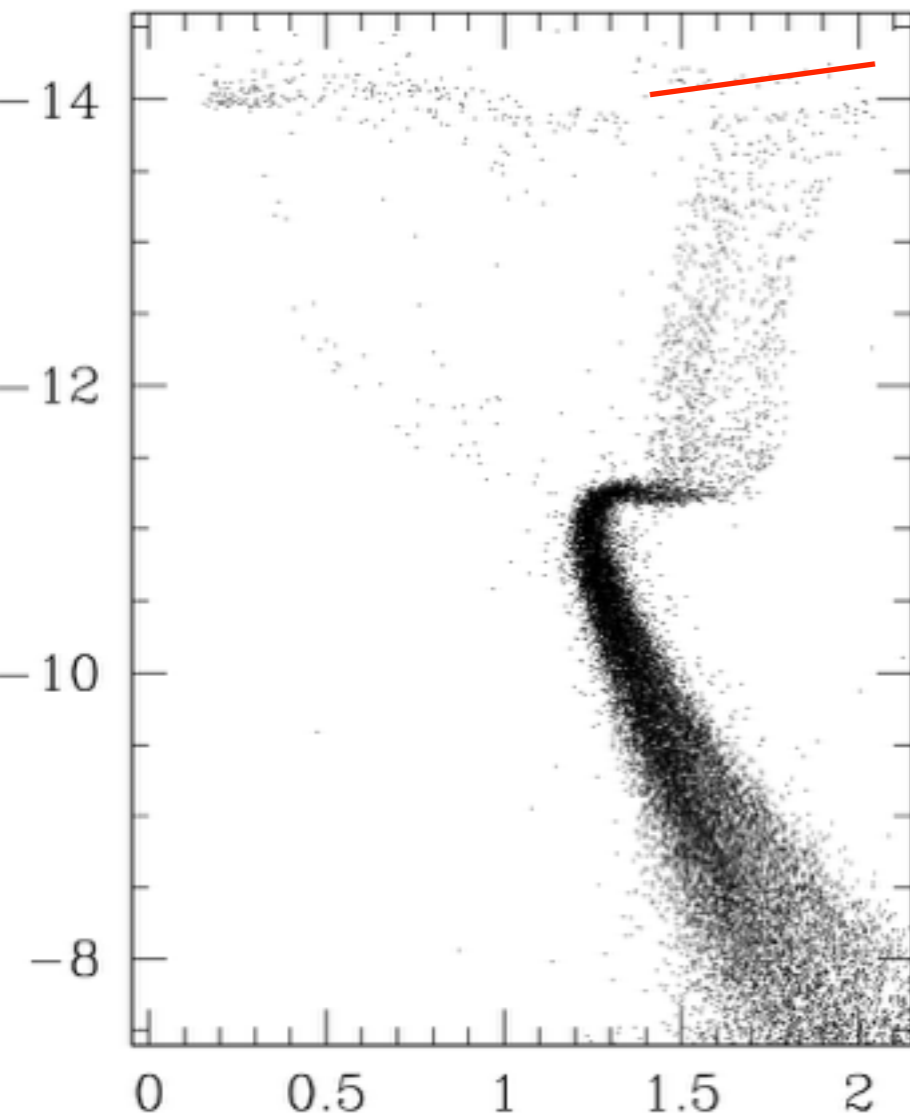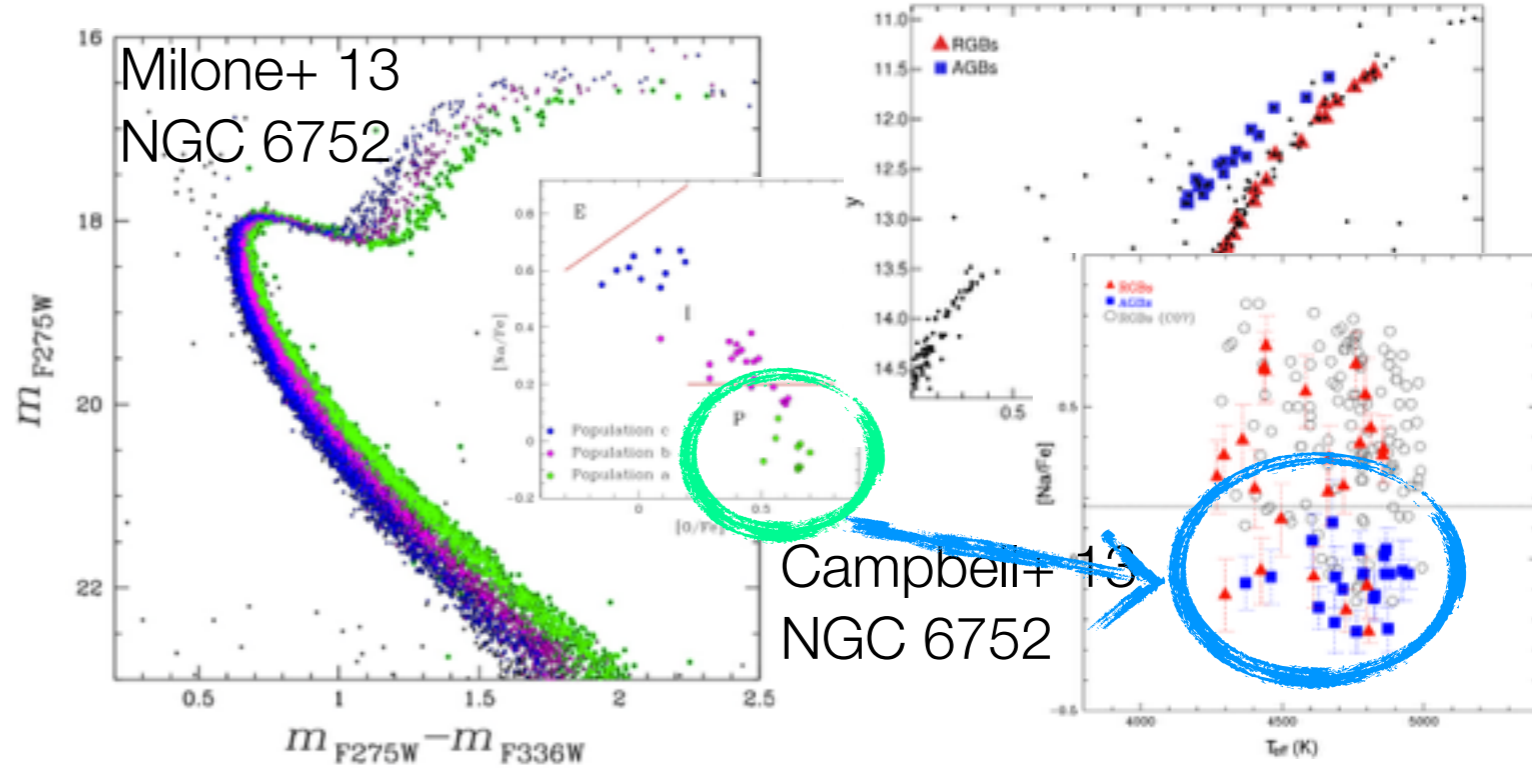AGB: **NO** CN-strong pop. (Norris+ 81) & **NO** Na rich pop.

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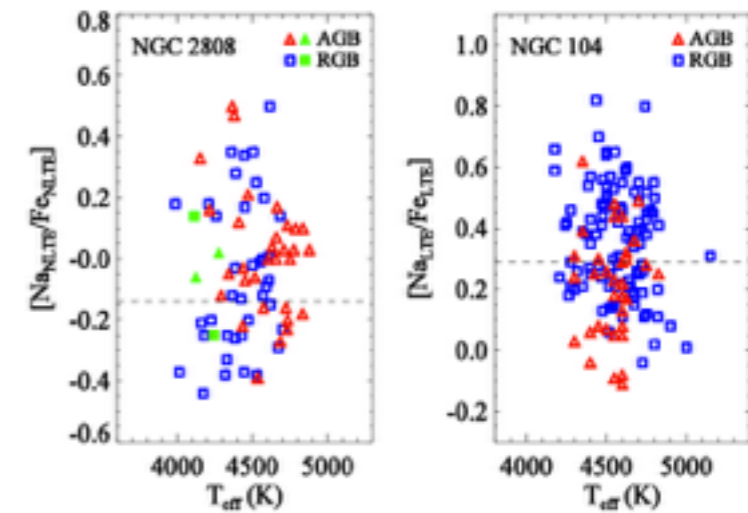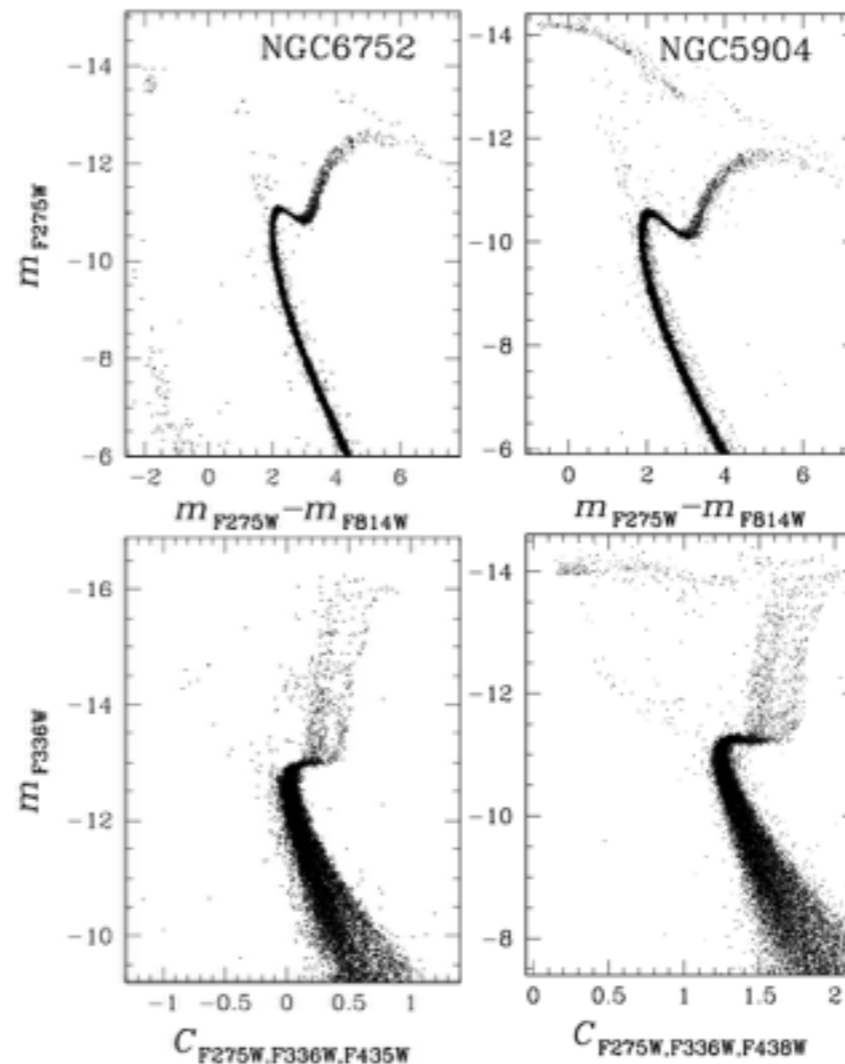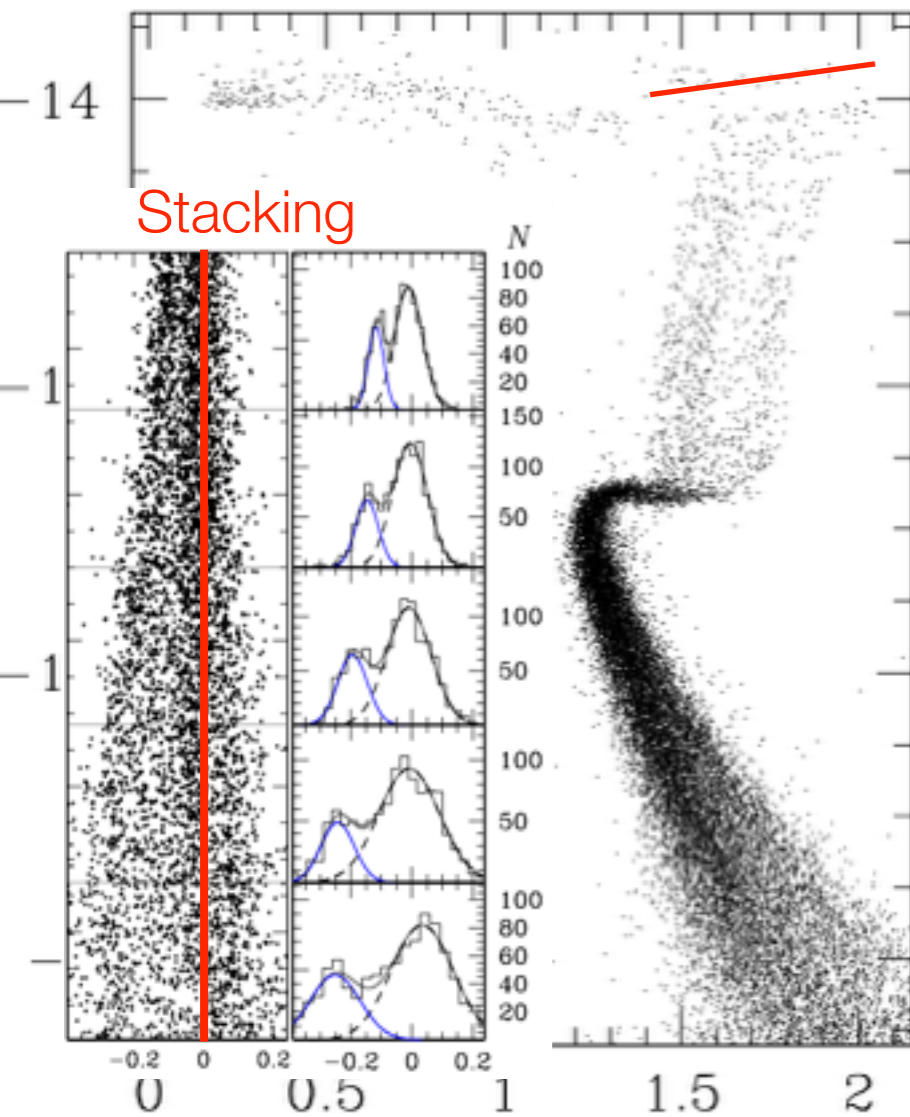
Stacking

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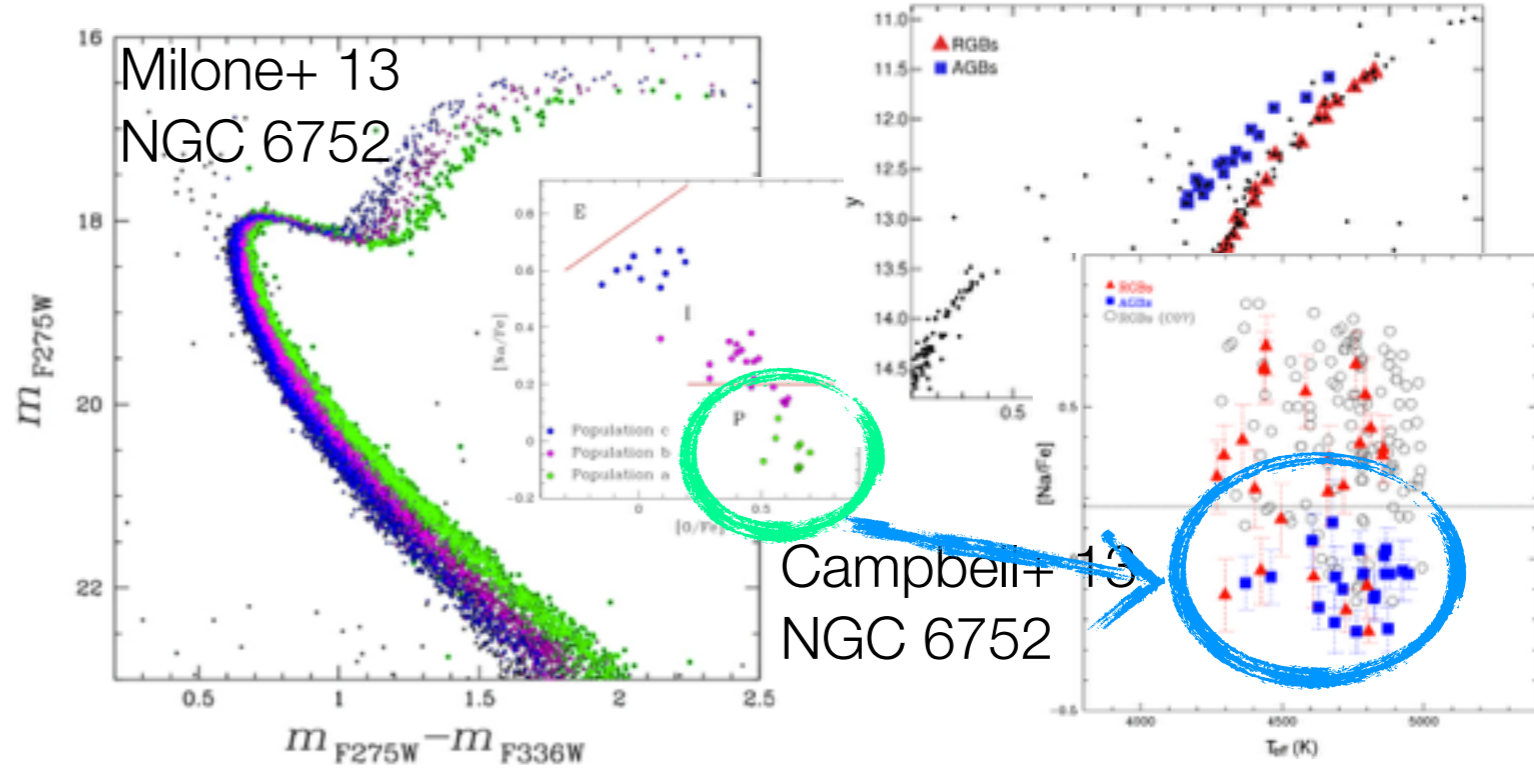HST Treasury Large Programme (60 GCs) observed with magic filters.

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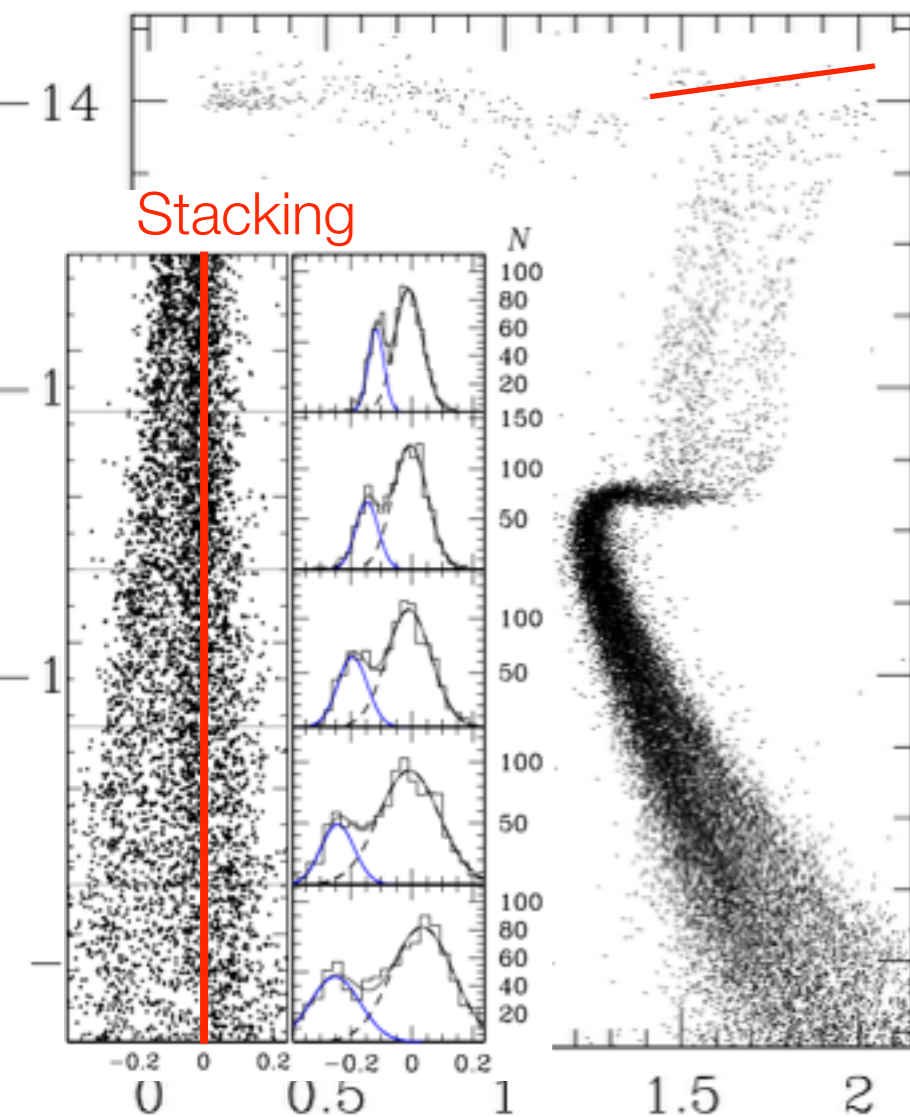
Stacking

NGC6752

NGC5904

NGC 2808   AGB   RGB

NGC 104   AGB   RGB

Already at this early stage we would have a lot of information of CN-strong stars, i.e. possible polluters, fraction, positions, enrichment range, etc, etc…

Immediate objectives

- 47/60 GCs accessible from VLT: Propose a large programme on UVES-FLAMES @ VLT to get HR spectra (R ~40k) of complete population of AGB stars in GCs.

- Create evolutionary tracks for He-enriched AGB stars.

- Build synthetic libraries for abundance measurements.

- Run N-body simulation with stellar evolution (of enriched and pristine chemistry) in GCs to match observed properties of the Treasury sample and AGB properties.

Working groups + timescales = publications

- Observing:

  - Candidate selection (few months, HST archive data)

  - Proposal (1yr), observations (1yr), data reduction/analysis (1yr)

- Theory:

  - Multiple pops. of GCs scenarios (1yr)

  - Stellar Evolutionary tracks for AGB (1yr)

- Modelling:

  - Synthetic spectral libraries of AGB stars: NLTE/3D (1yr)

  - N-body/Dynamics of multiple pops of GCs (1yr)

  - SSP models with empirical library from the VLT survey (months)

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Ingrid Jean-Baptiste
Lucas Grosset
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Govind Nandakumar

Publications (at least 7 to start)

- Chemistry from CMD (stack of AGBs from HST CMDs)

- Chemistry from abundances using NLTE/3D models (Na, O, Mg, Al at least for AGBs)

- Evolutionary tracks AGB phase: 2 partial papers while it runs within 1 yr

- Empirical spectral library of AGBs (reduced, calibrated spectra = public)

- Dynamics vs. observations (does AGB has a special dynamical evolution?)

- SSP models updated with known AGB spectra.