Iron and Alpha in Extragalactic Red Giants with Low Resolution Spectra

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The Globular Clusters – Dwarf Galaxies Connection
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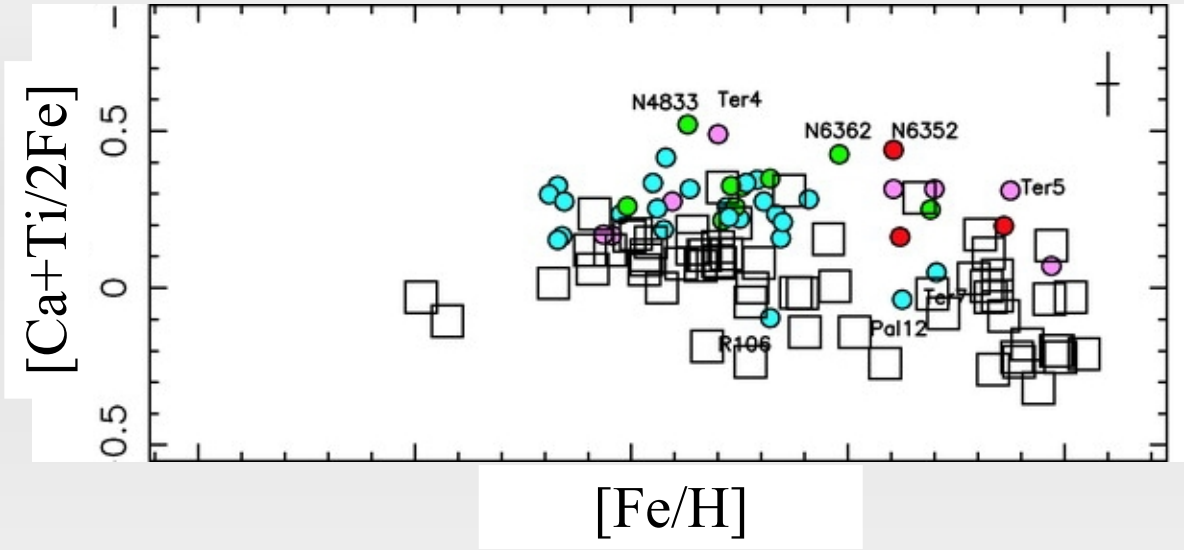
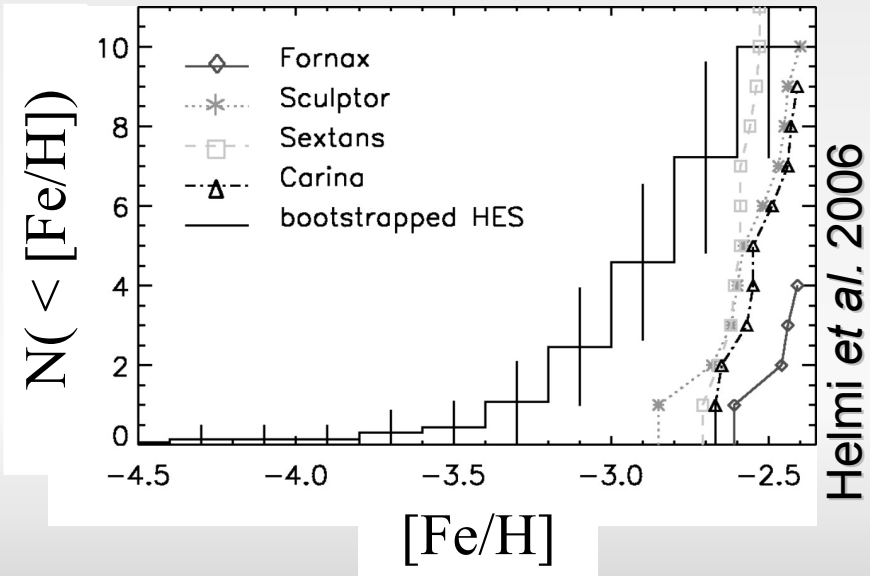
Chemistry is History

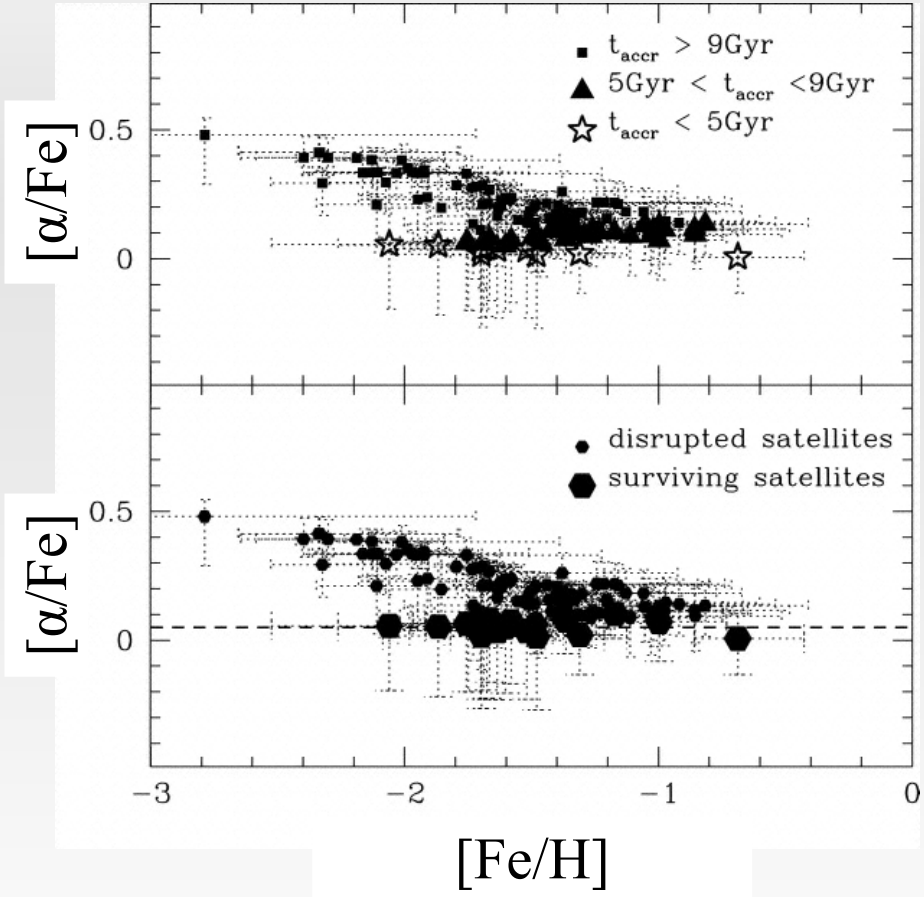


Pritzl, Venn, & Irwin 2005



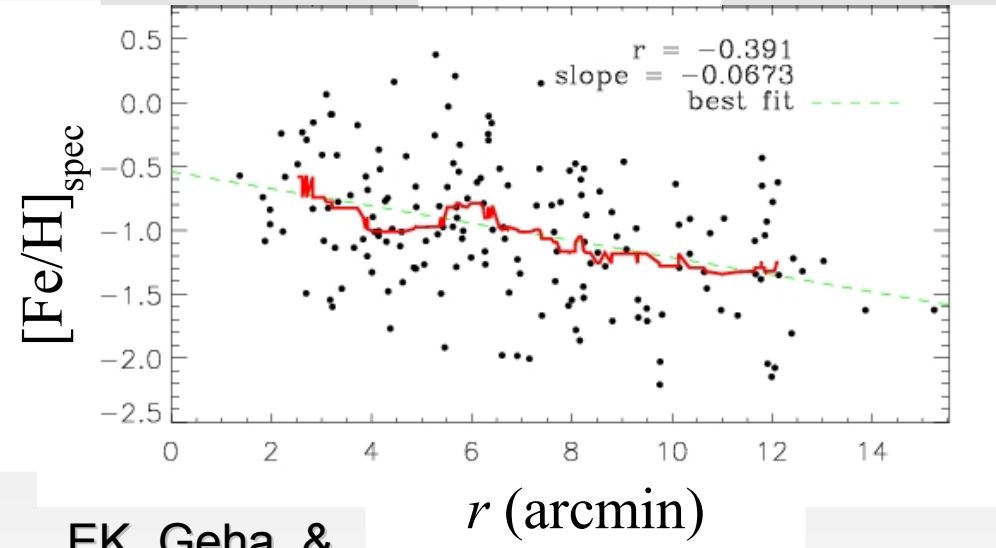
Helmi *et al.* 2006

Chemistry is History



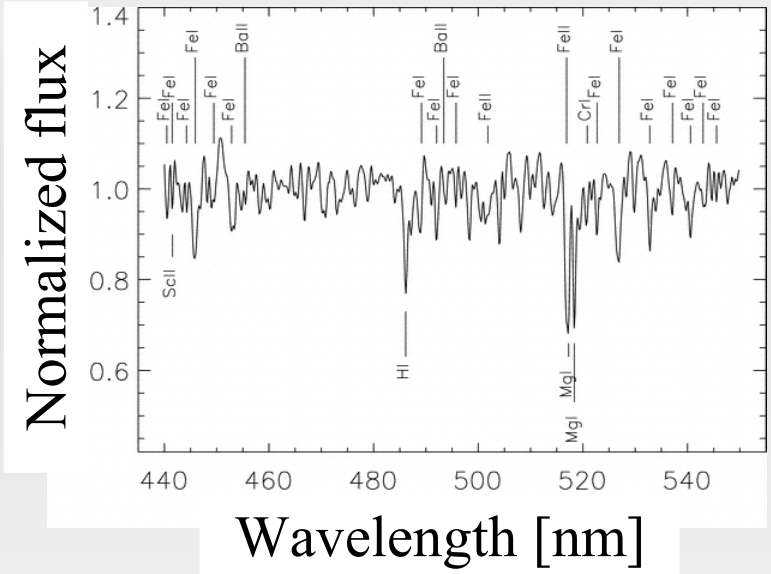
Font, Johnston, Bullock, & Robertson 2006

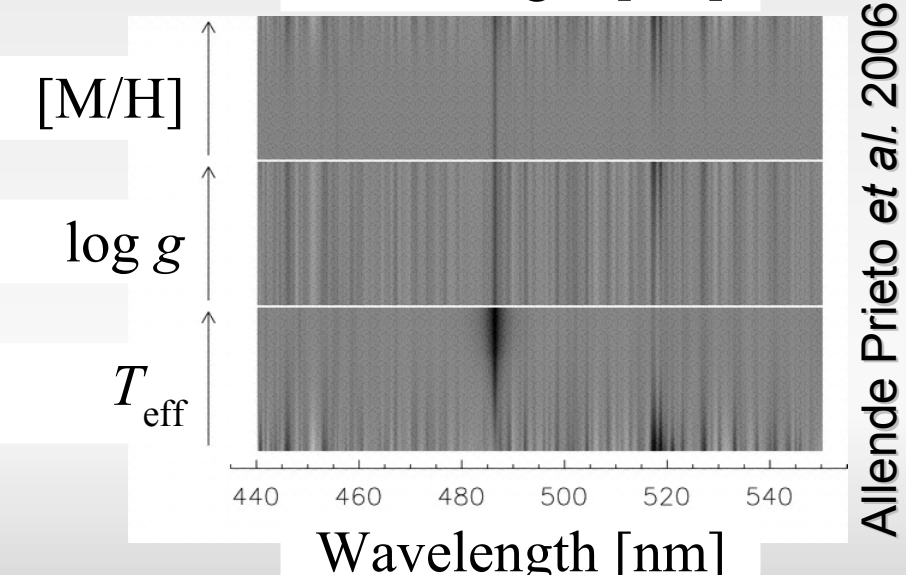
NGC 185



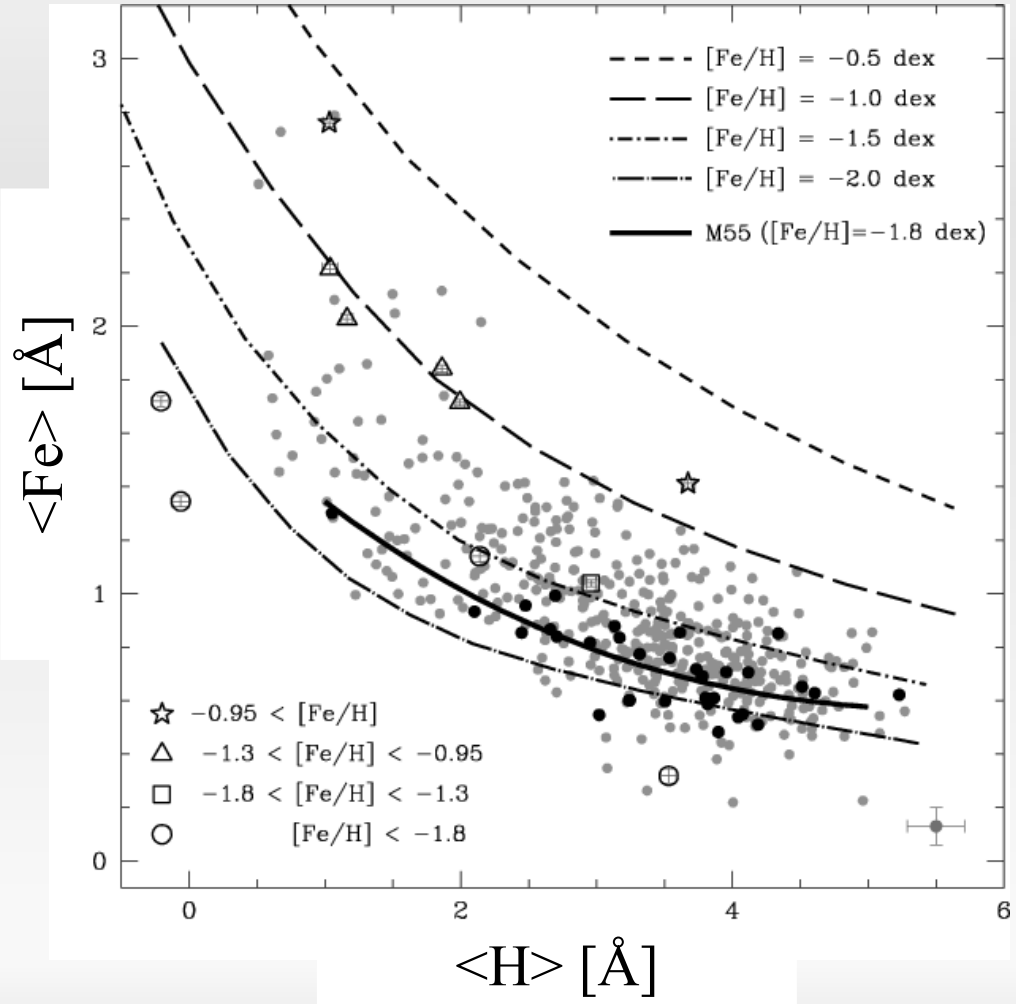
EK, Geha, & Guhathakurta (in prep.)

Previous Low-Res Abundances



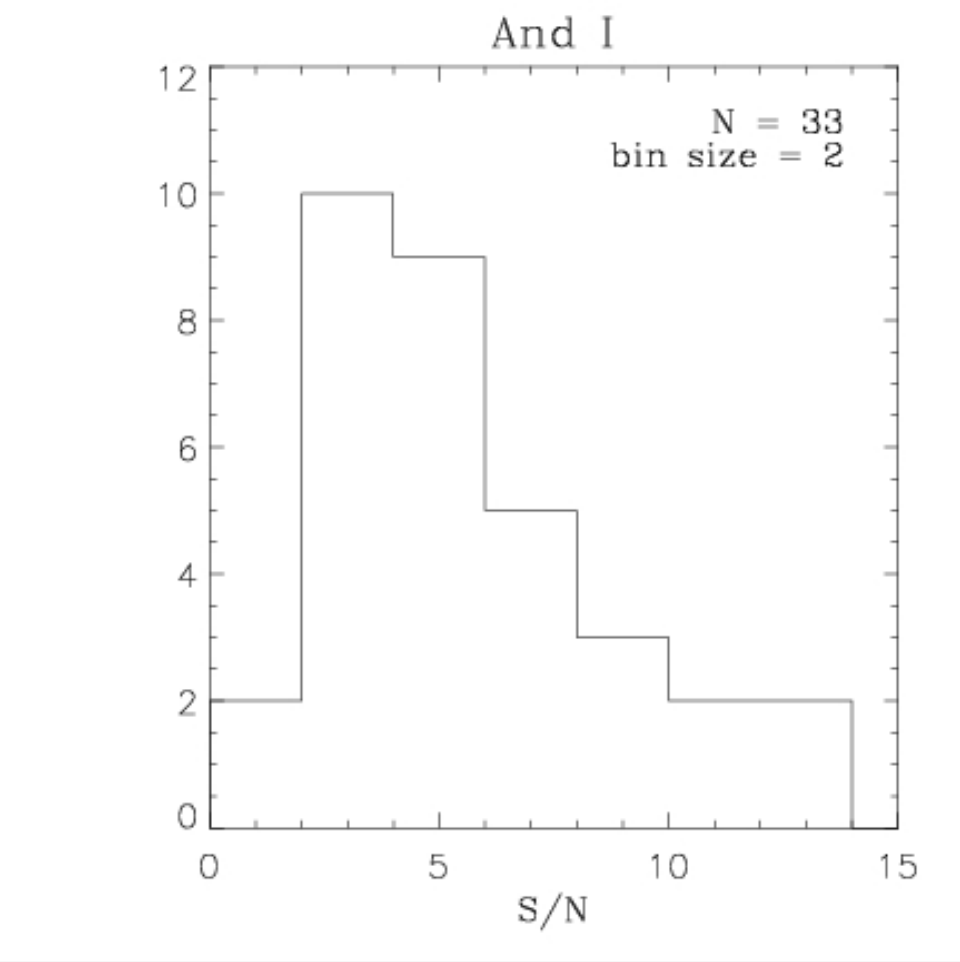


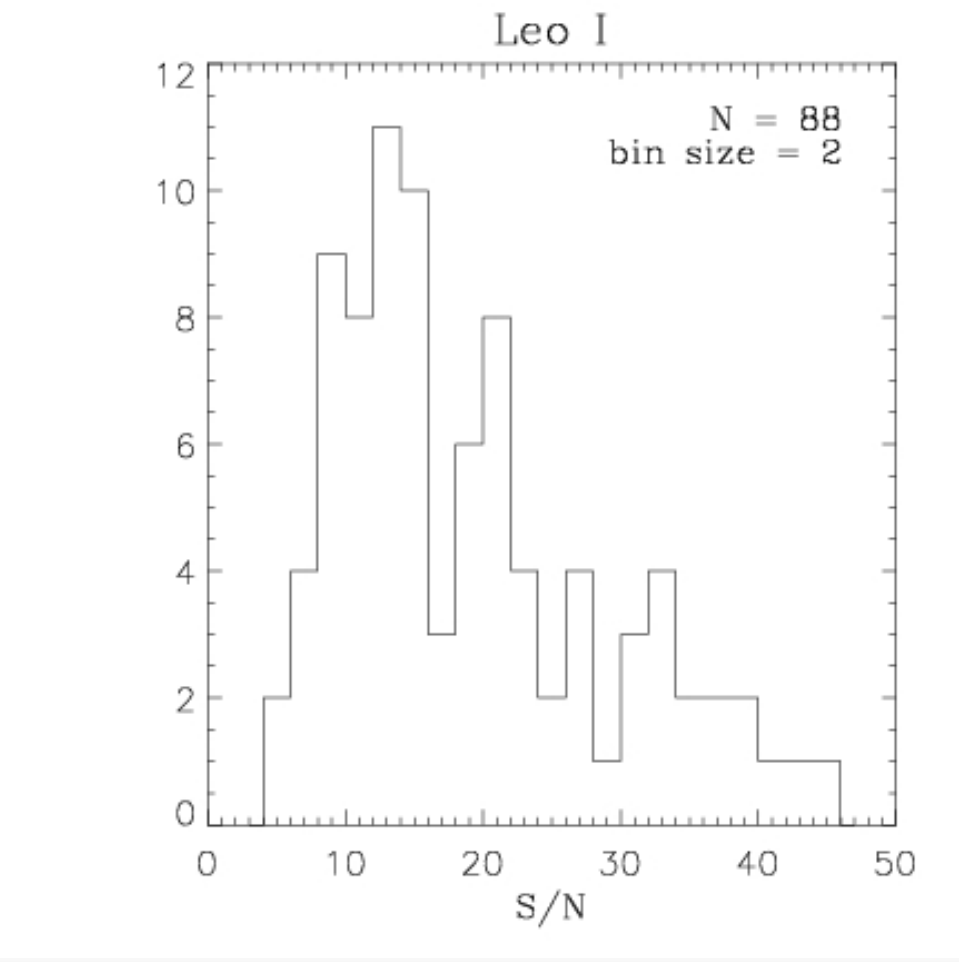
Allende Prieto *et al.* 2006



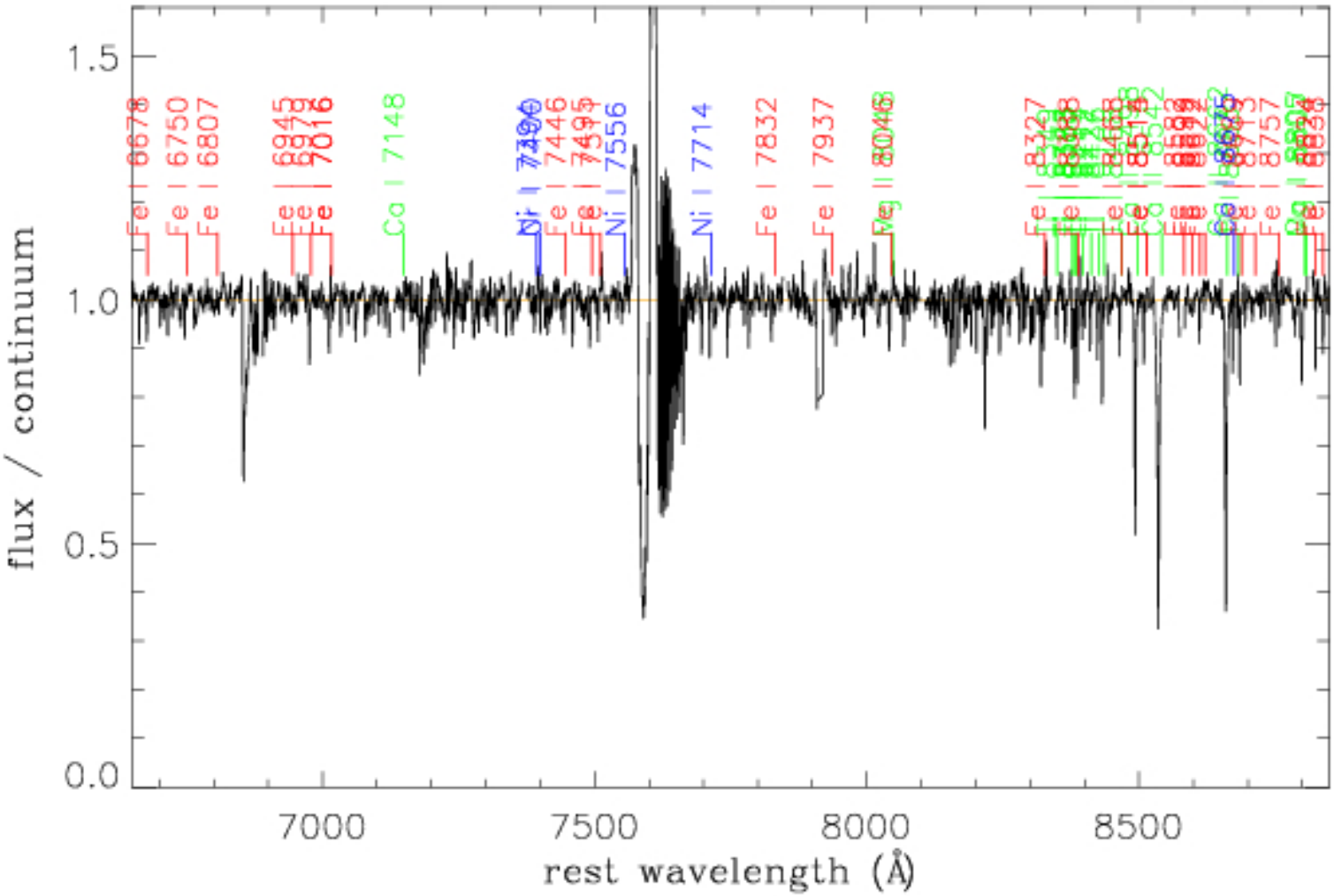
Kayser *et al.* 2006

Signal-to-Noise

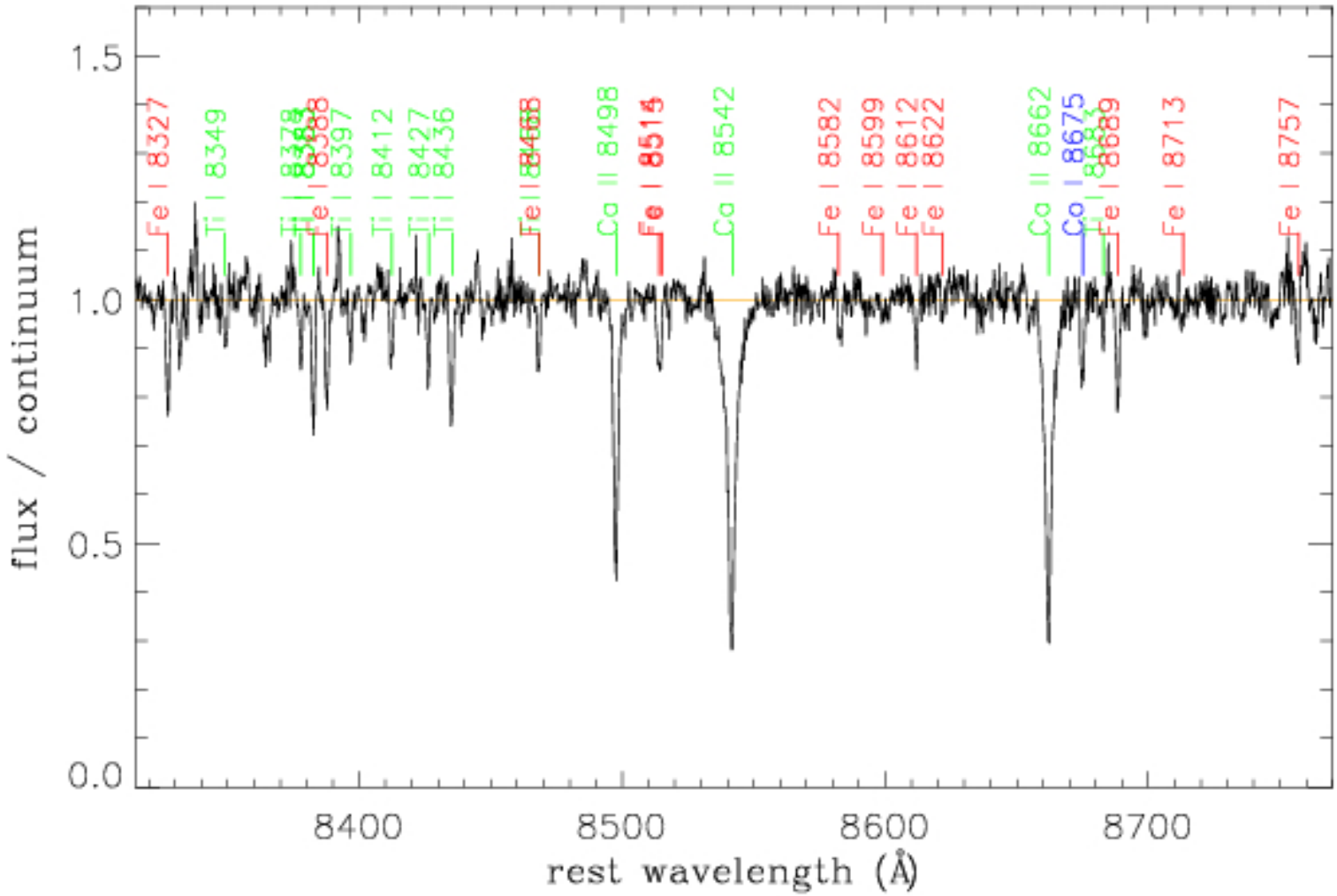




Visible Lines



Visible Lines



Spectral Synthesis

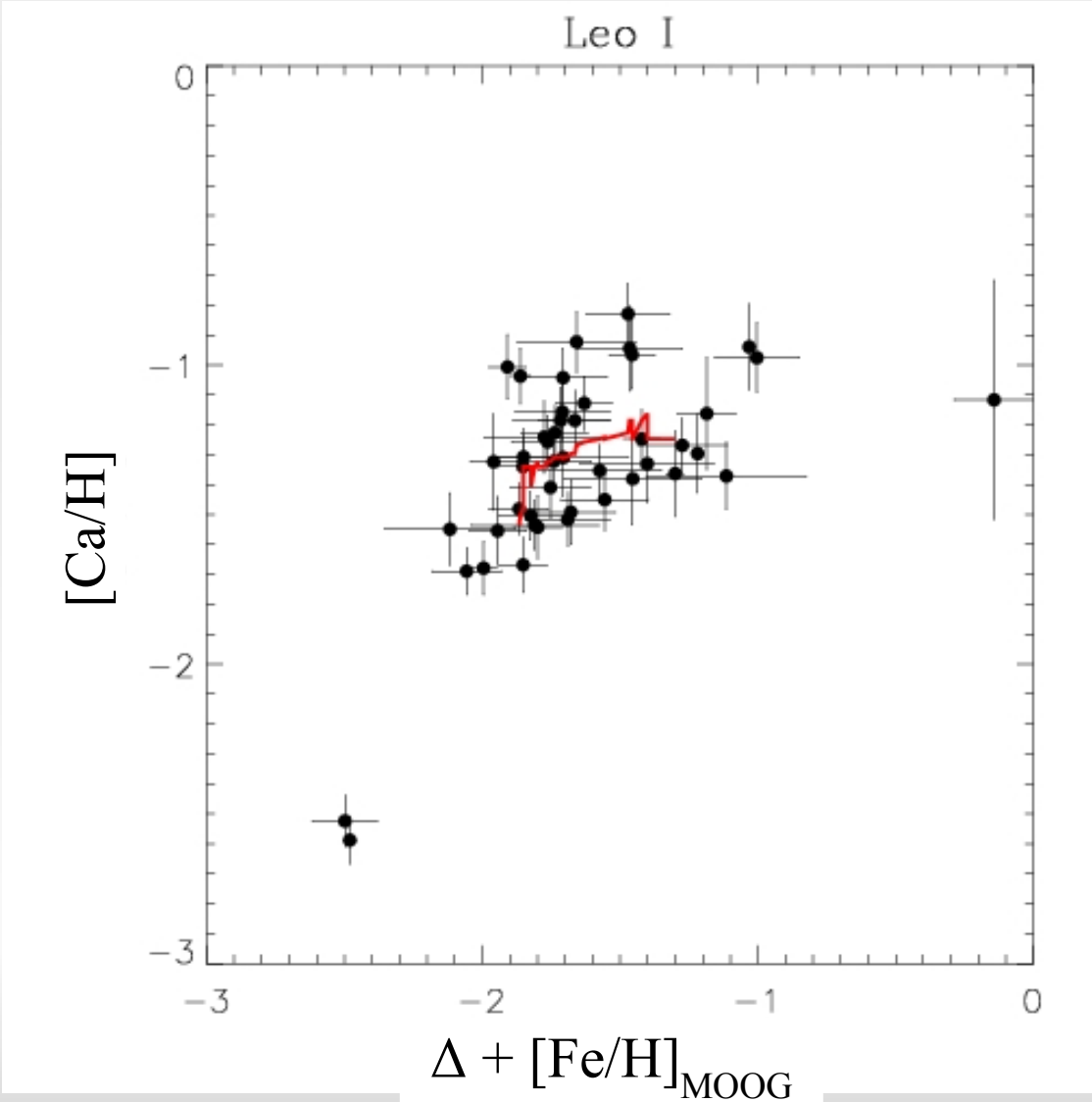
Ingredients

- 2 broadband colors (*V*, *I*)
- 48,967 atomic and molecular transitions

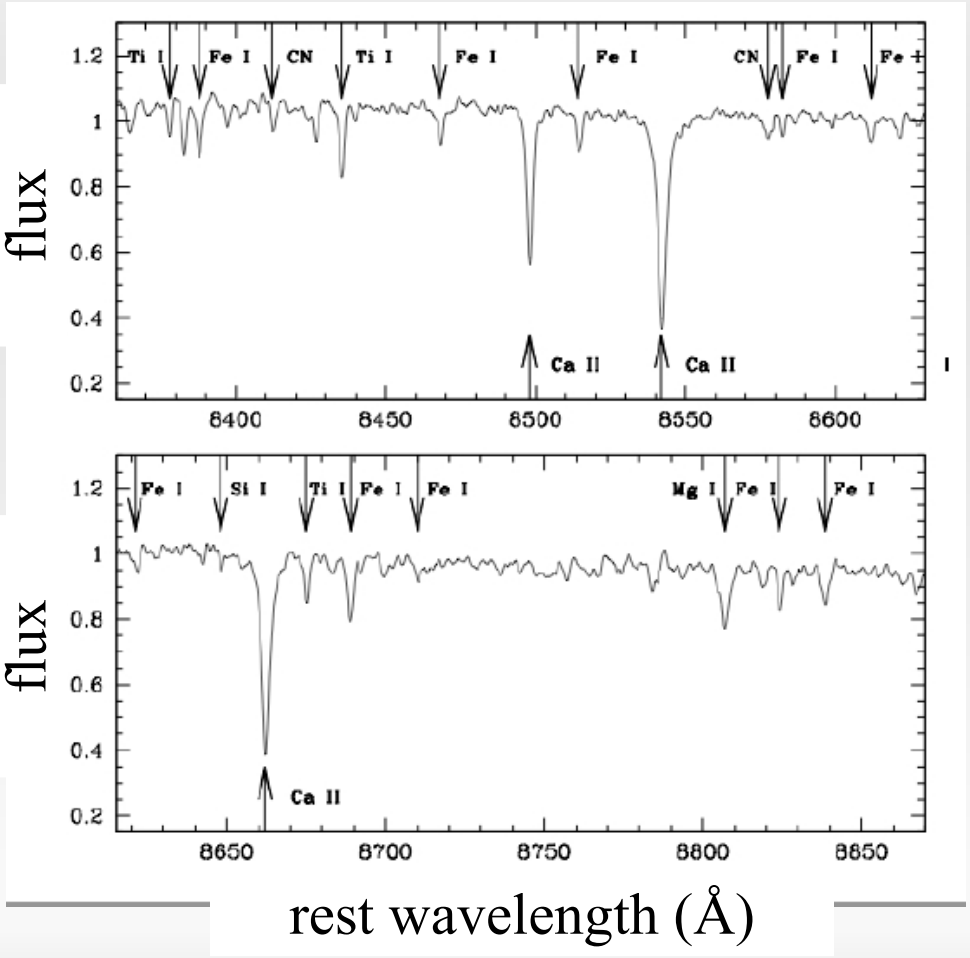
Recipe

1) Mold line list into Sun and Arcturus.
2) Prepare one Kurucz LTE atmosphere.
3) MOOG for 2 minutes.
4) Smooth by instrumental resolution.
5) Repeat steps (2)-(4) 66,150 times.
6) Minimize χ^2 and serve.

Extragalactic [Ca/Fe]



The Future: Coaddition



- coadd stars of similar photometric properties
- coadd tens of M31 stars to approximate Leo I spectral quality

Conclusions

- MW dSphs have abundance patterns different from MW GCs, and extragalactic stellar systems are begging for analysis.
- Low resolution spectra can yield $[\mathrm{Fe/H}]$ and $[\alpha/\mathrm{Fe}]$.
- Expect abundances from many red giants in MW and M31 dSphs soon.