Determining Ages of APOGEE Giants with Known Distances

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Apache Point Observatory Galactic Evolution Experiment

- Explore Galactic evolution through detailed chemical abundances
- High resolution near-IR spectrograph
- 130,000 red giants, ~400,000 in APOGEE-2

Nidever+ 2014
Abundances Across the Disk

Hayden+ 2015
Abundances Across the Disk

- Direct comparisons of different radial bins is difficult
- SFR, inflow, mixing, etc

Hayden+ 2015
Ages and Abundances

Age adds crucial evolutionary information and population identification

Haywood+ 2013
Ages and Abundances

Haywood+ 2013
Ages of Red Giants

- Need distance
- Bayesian isochrone matching
- Assume flat SFH

\[ \sigma = 0.1807 \]
Local Sample

- 700 local giants within 400 pc
- Use Bayesian analysis to find ages
Hierarchical Modeling

- Better prior on the SFH
- Use the full age PDF to constrain a model SFH
- $\alpha$-dependent Gaussian SFH
Age Trends

- Strong relation between $\alpha$ abundance and mean age of Gaussian model
- Age-metallicity relation consistent with other work
- Velocity dispersion consistent with GCS
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Future Work

- Use monoabundance subsamples
- Apply to RC sample
- Apply to full APOGEE sample with Gaia distances
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QUESTIONS?