Opportunities for combined GES-GALAH science

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University of New South Wales
Lead, GALAH observations

The GALAH survey

- Using HERMES spectrograph at AAT in Australia
- Fed by 2dF fibres: ~360 stars per field
- R=28,000, 4 simultaneous wavelength channels
- Up to 29 elements per star
  - light: Li, C, O, Mg
  - alpha: Si, Ca, Ti
  - odd-Z: Na, Al, K
  - iron peak: Sc, V, Cr, Mn, Fe, Co, Ni, Cu, Zn
  - s-process: Rb, Sr, Y, Zr, Ru, Ba, La
  - r-process: Ce, Nd, Eu

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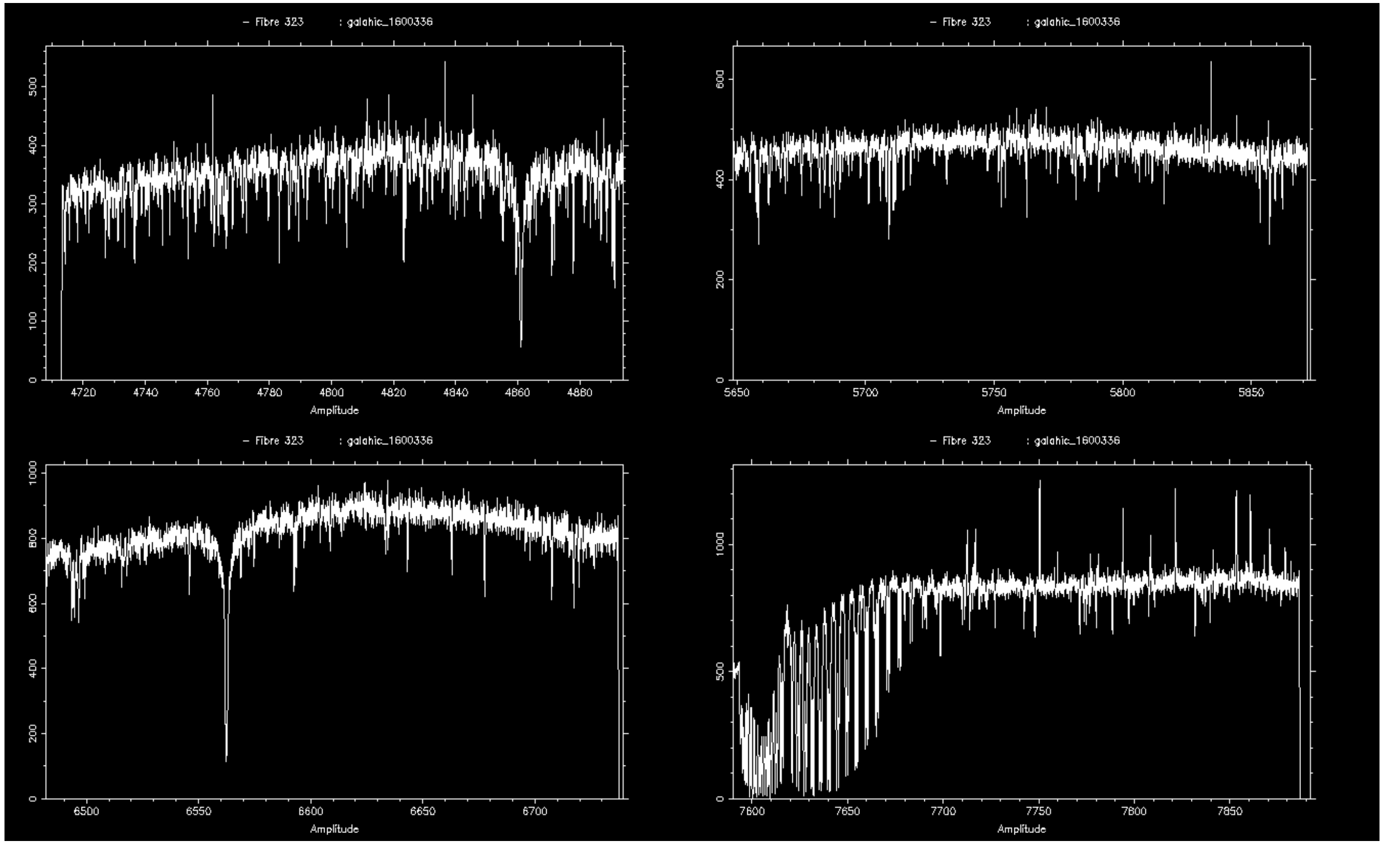

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- 5649-5873Å
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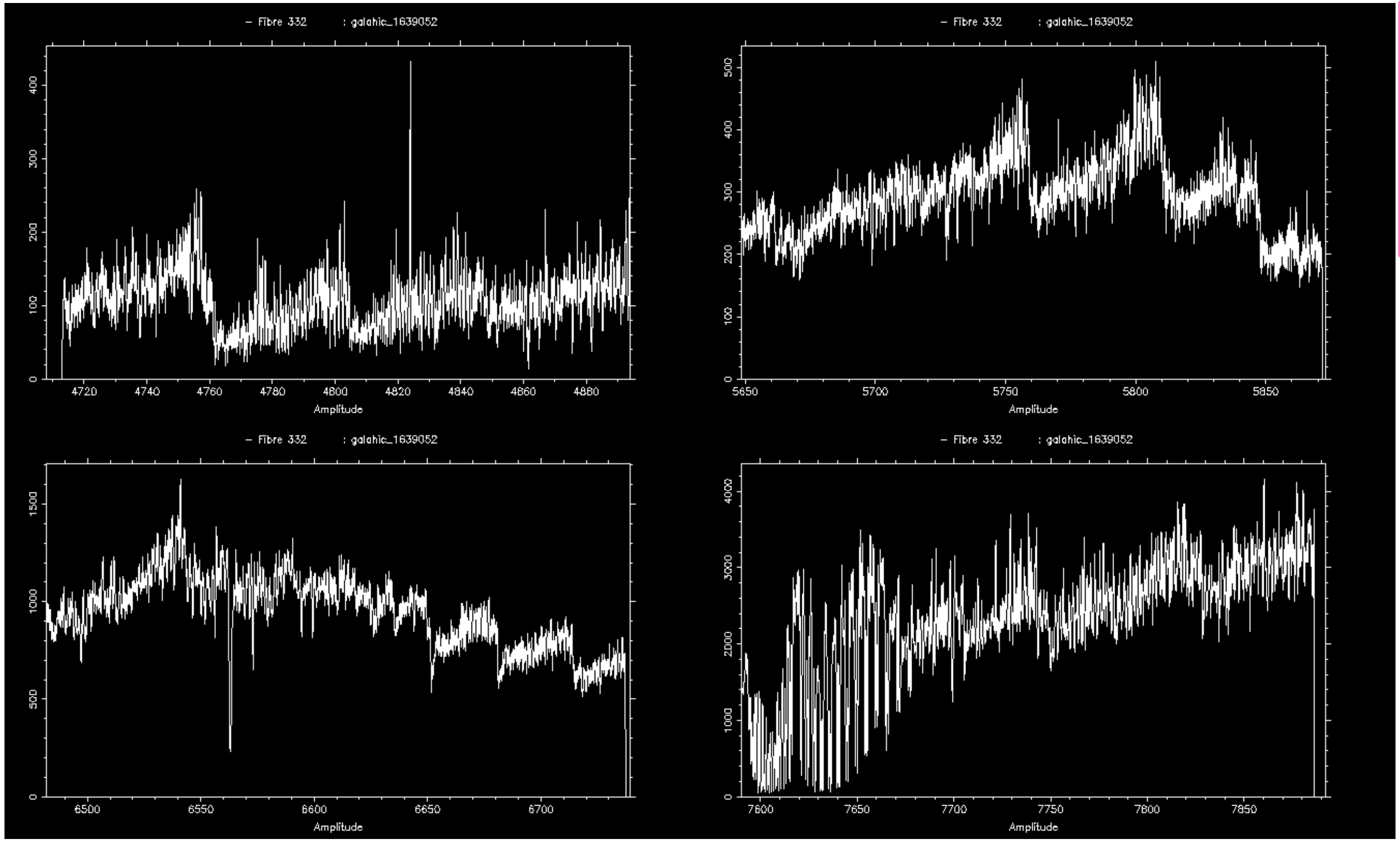

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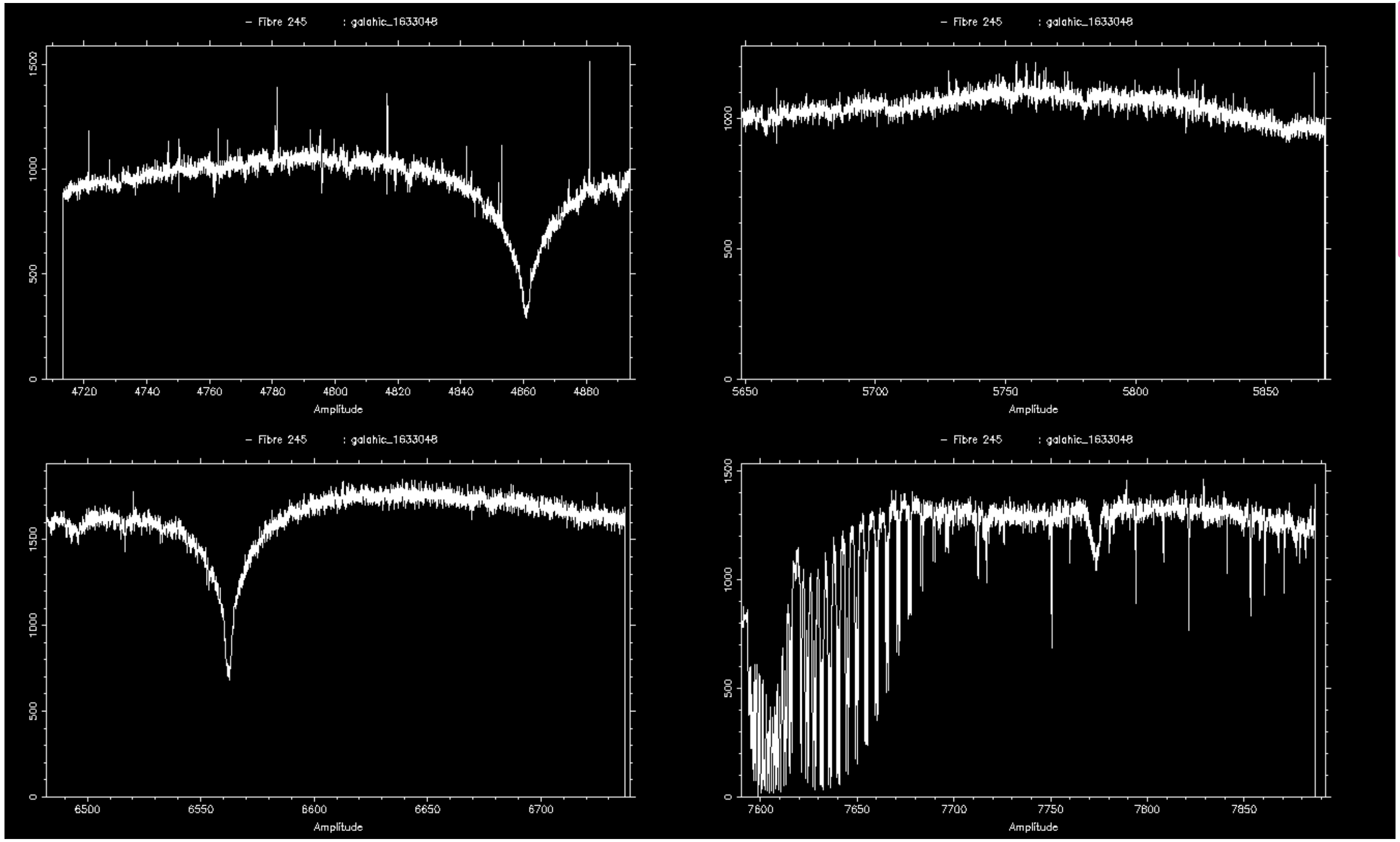

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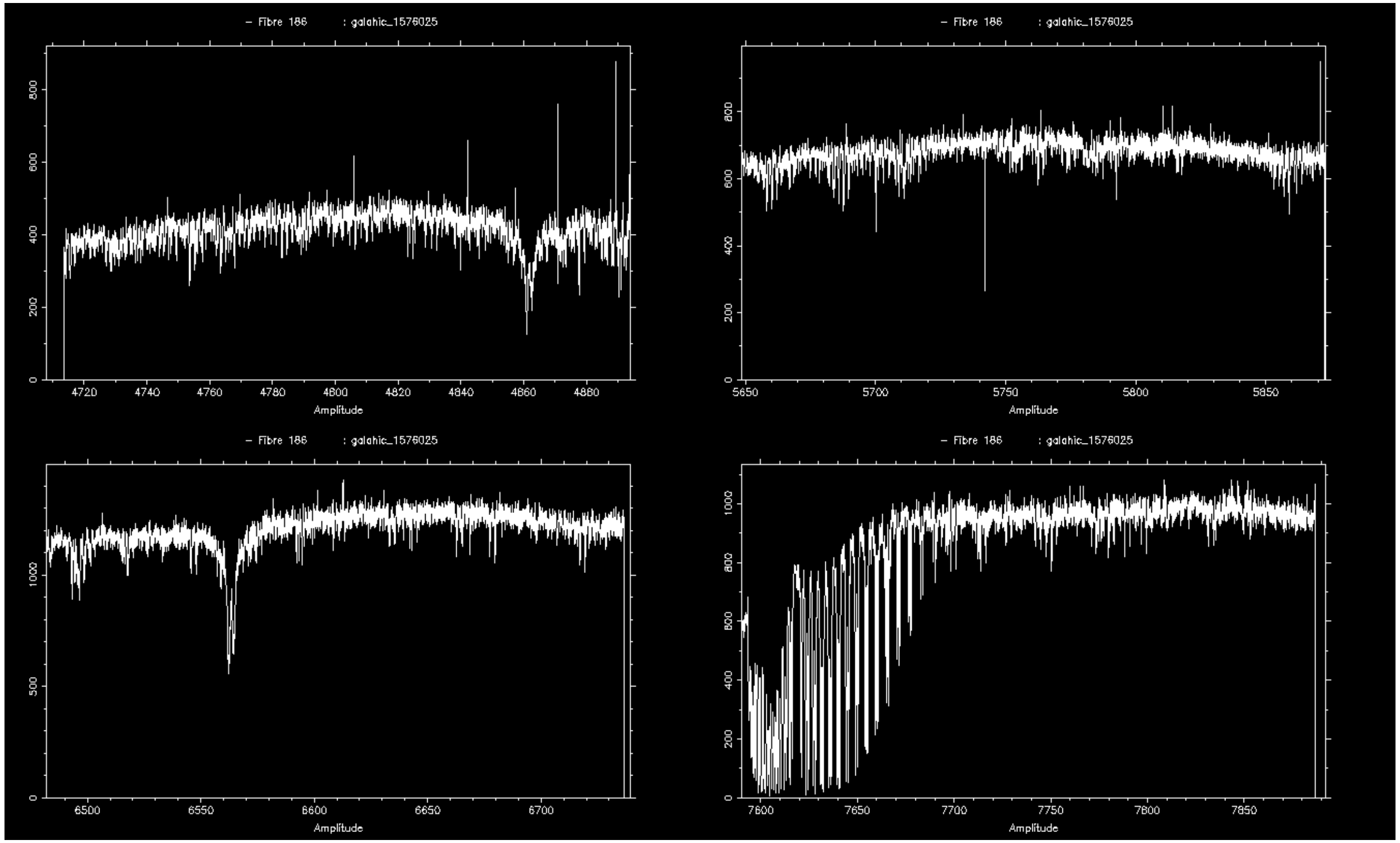

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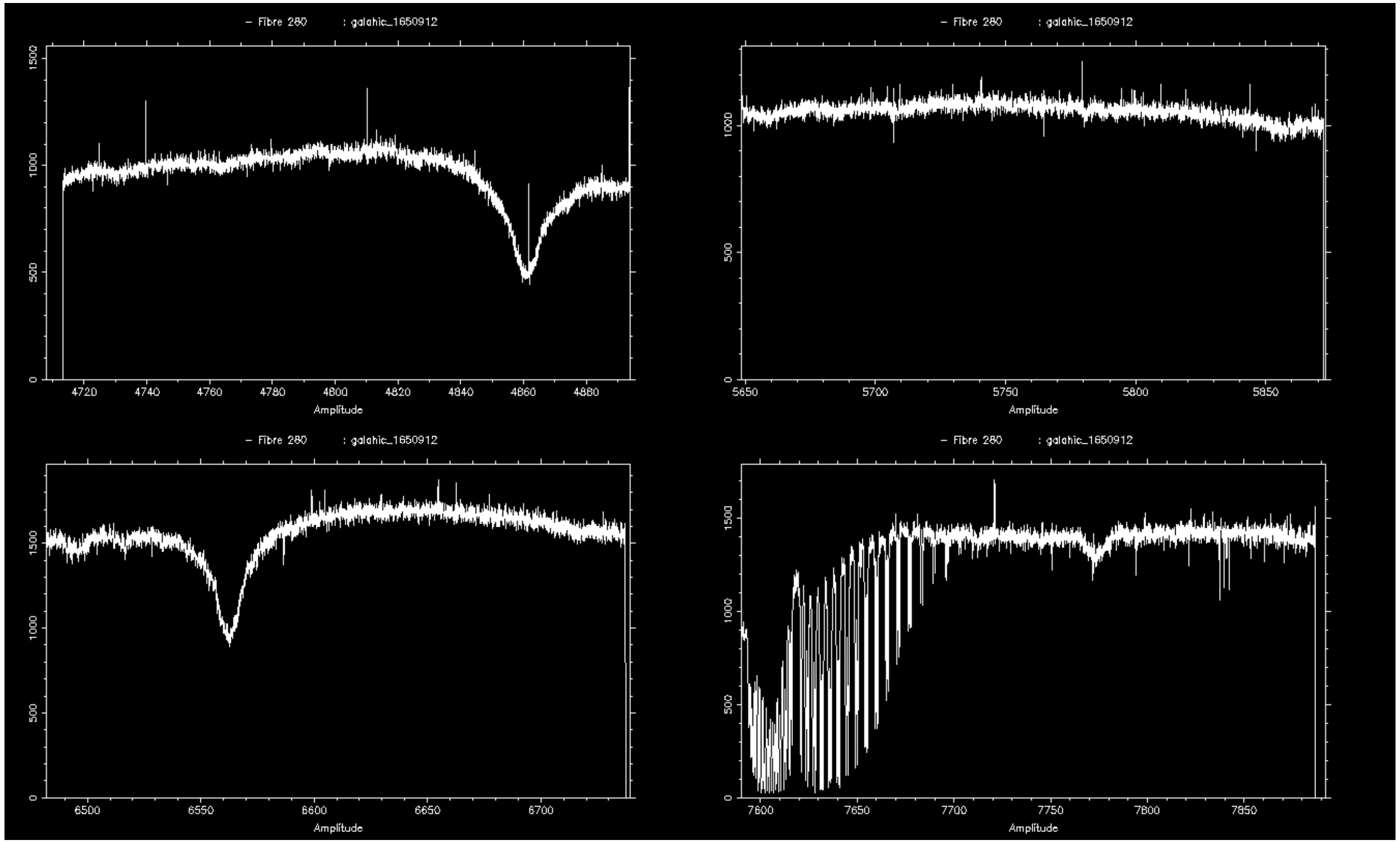

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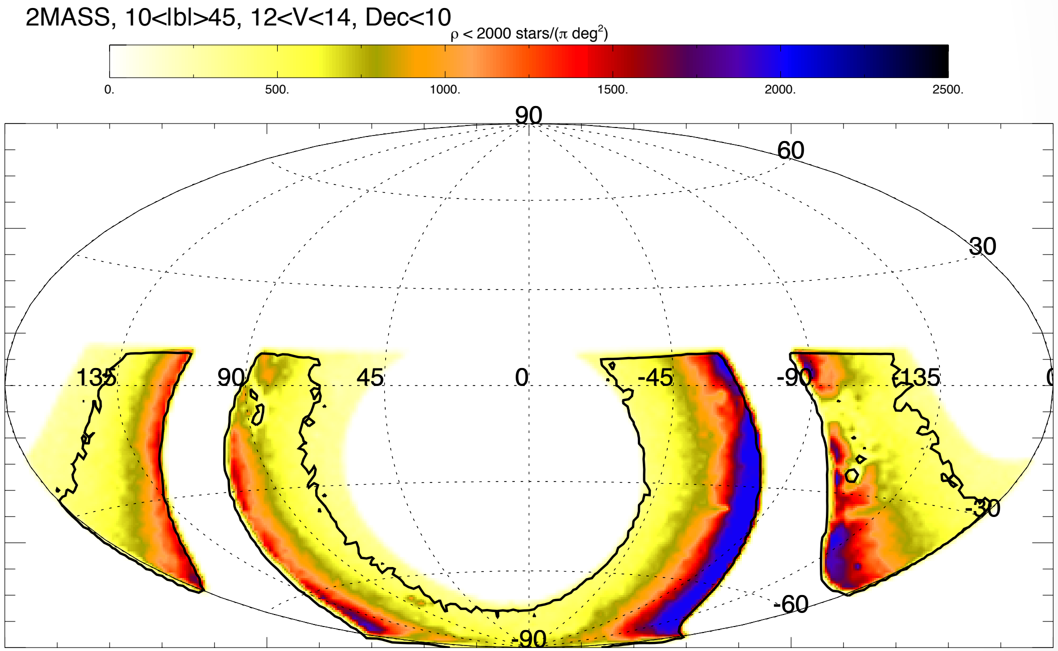
The GALAH survey

- 12<V<14, no colour selection
- |b|>10, ρ >400/π deg²
- Goal of 10^6 stars



The GALAH survey

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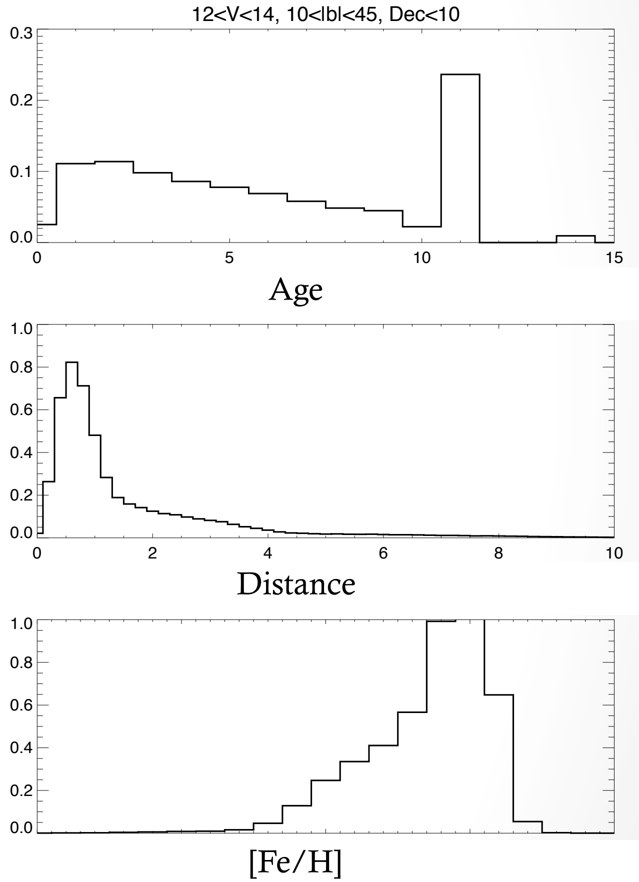
- |b|>10, ρ >400/π deg^2
- Goal of 10^6 stars
- Expectation from Galaxia:
  - ~75% thin disk
  - ~24% thick disk
  - ~1% bulge
  - ~0.1% halo
  - Dwarfs to ~2kpc, giants to ~5 kpc
- ➢ Different selection makes GES and GALAH very complementary



GALAH: progress so far

- Pilot survey, Nov 2013 - Jan 2014
  - 26 nights, 3 main projects
    - Thin-thick disk normalisation (28 fields)
    - Star clusters (M67, 47 Tuc, ω Cen, NGC 1851, NGC 288, NGC 362)
    - CoRoT co-observing (7 anticentre fields)

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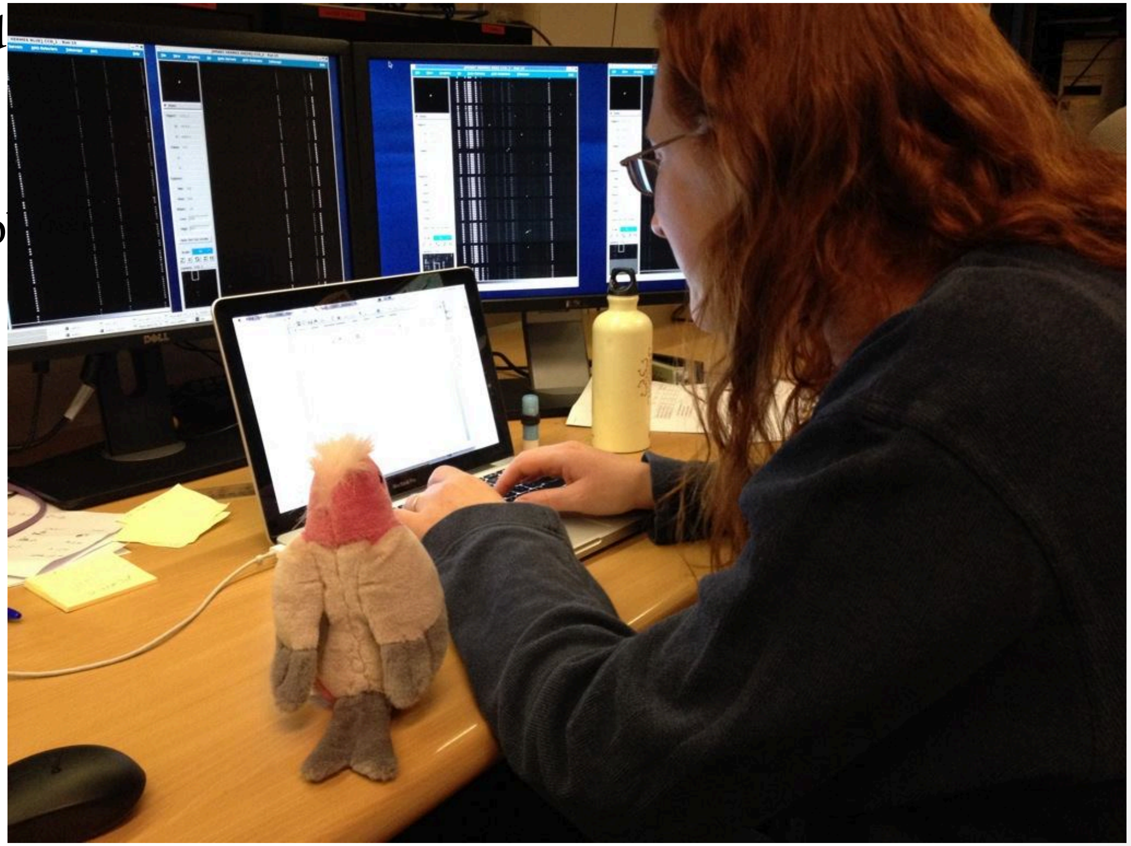

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  - Overlap with instrument commissioning: lots of work testing performance, data reduction, organisation, analysis

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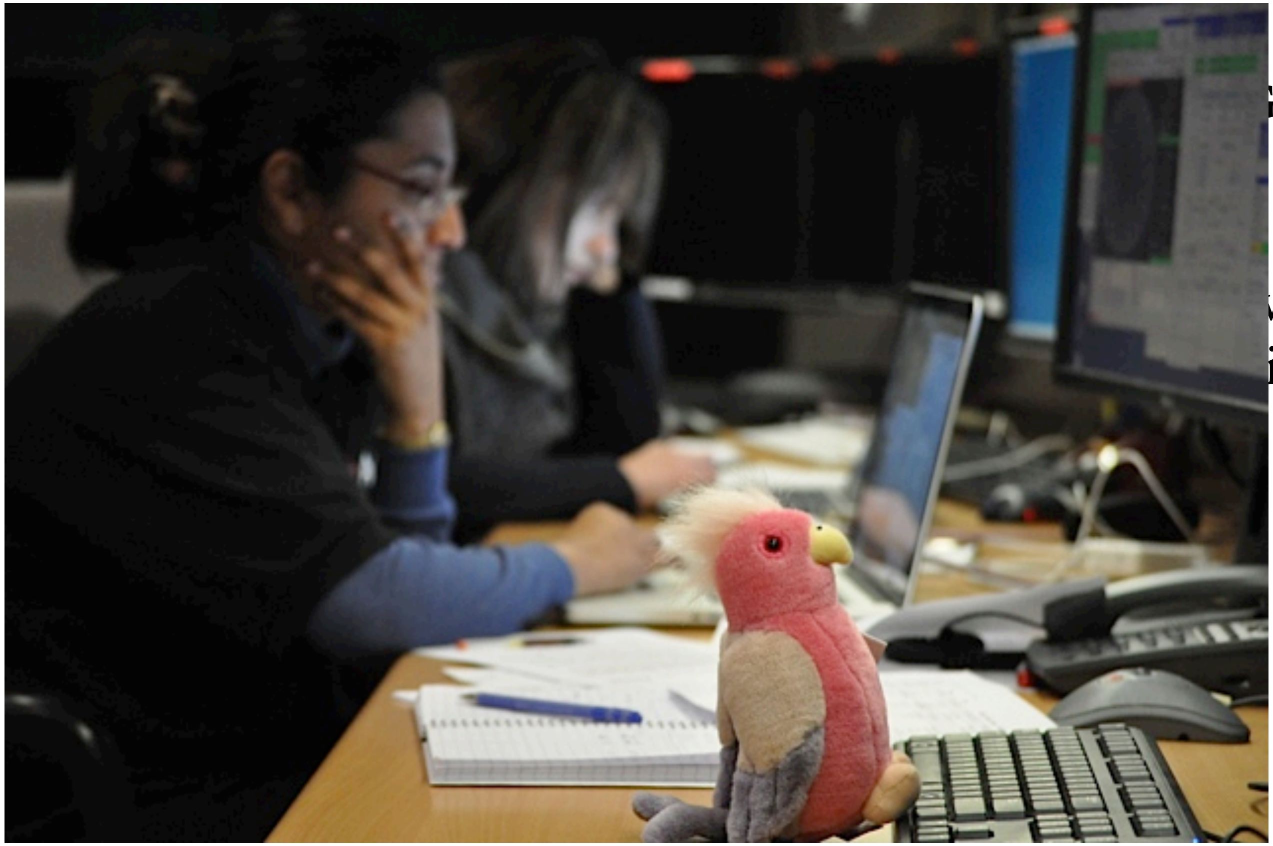

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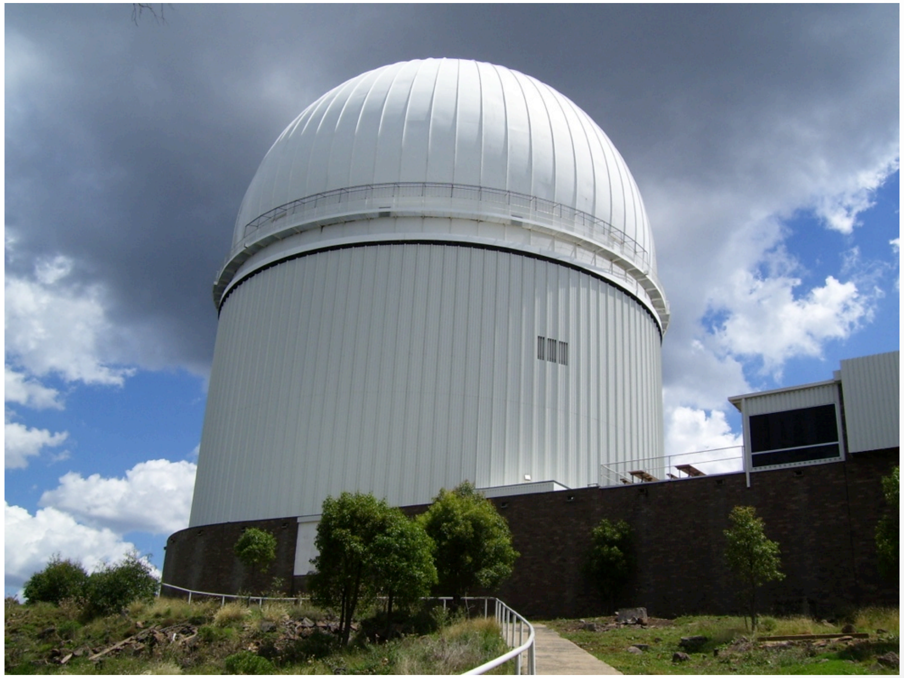

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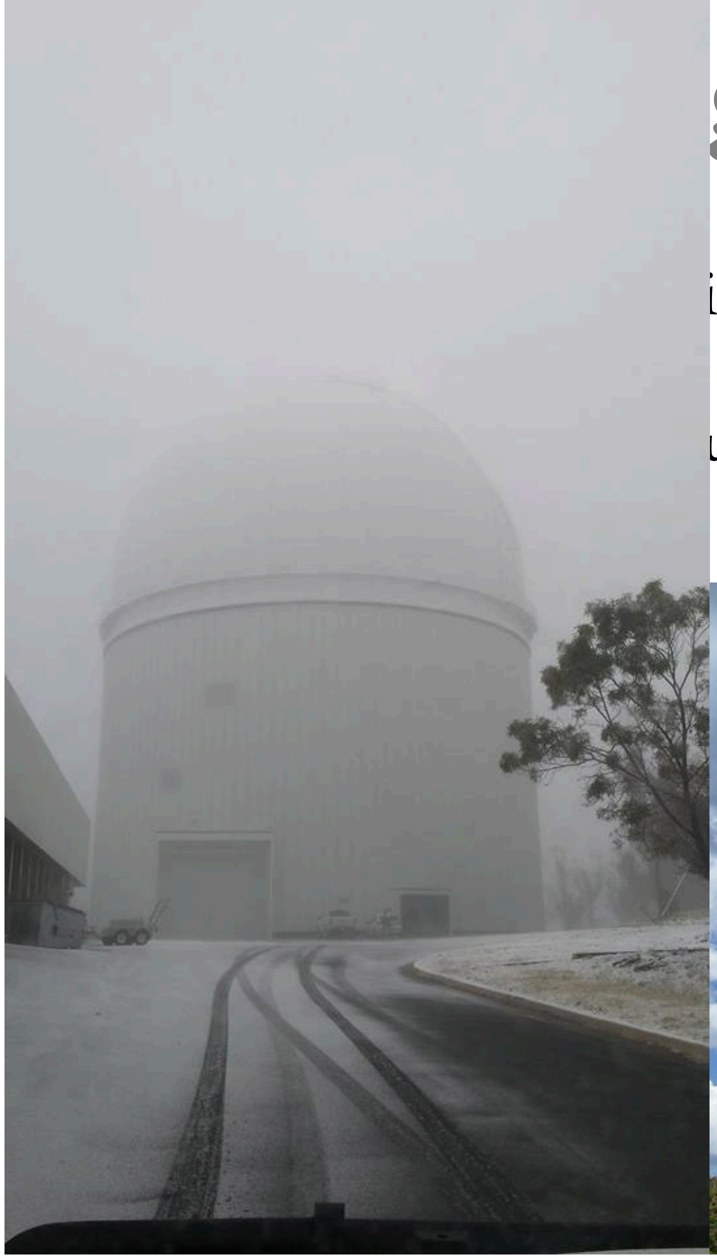

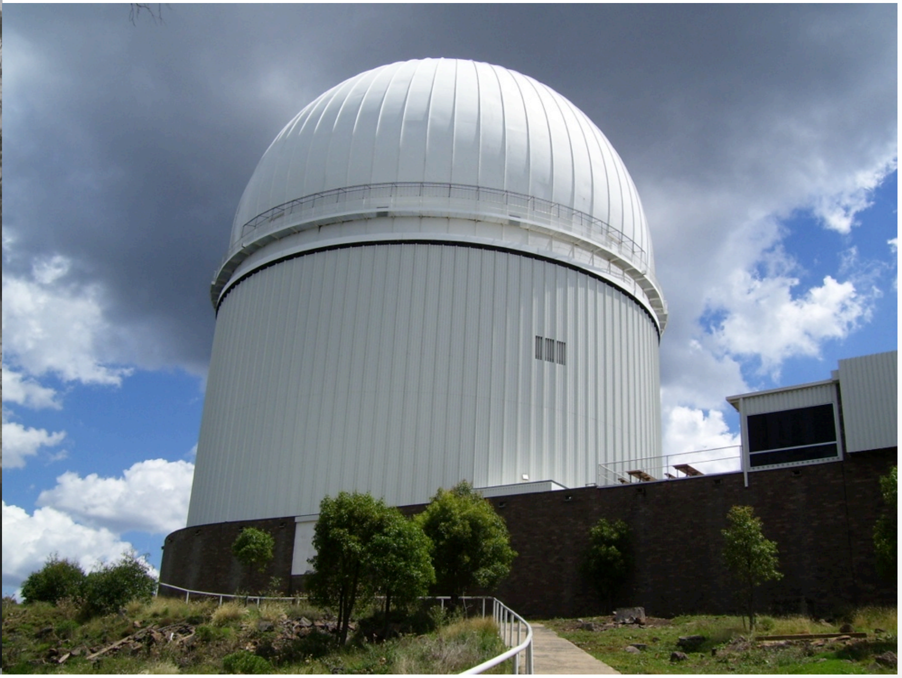

GALAH: progress so far

- Main survey: 77 nights since Feb 2014, 200 more requested through Jan 2017
  - Lose 28% to weather (plus a bit to seeing)
- In 60 nights so far
  - 76688 stars in 216 fields
  - Of those, 5992 stars/17 fields are in the Kepler-2 campaign regions

GALAH: progress so far

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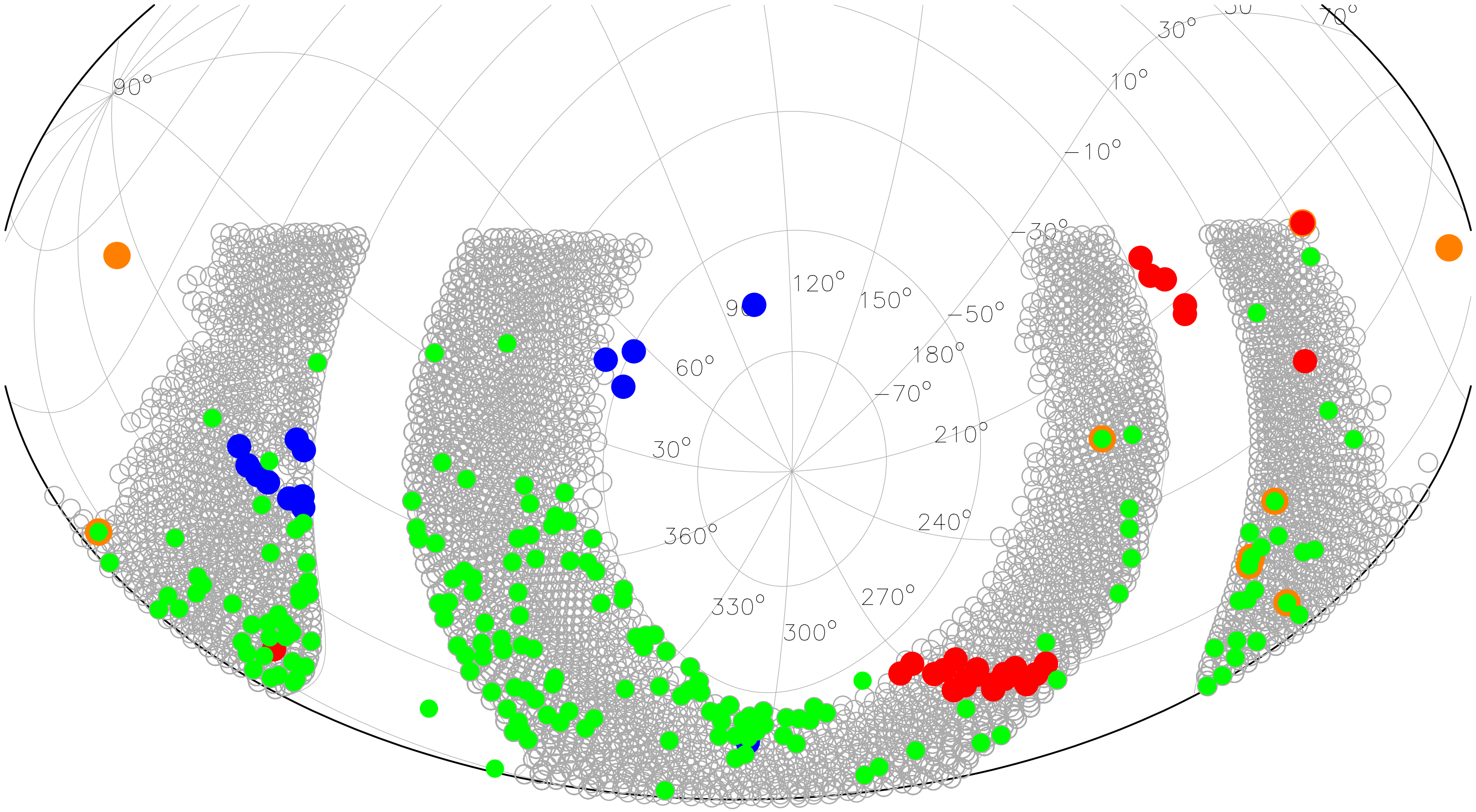
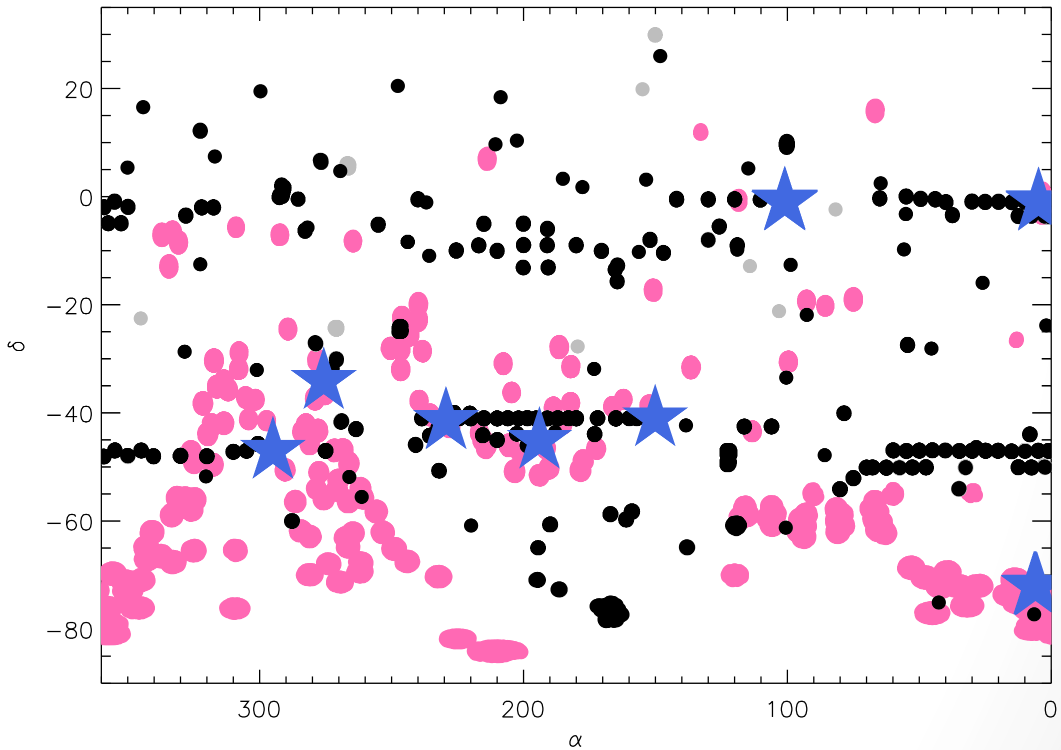


GES plus GALAH

- So with 32042 stars in iDR2/Targets and 64016 reduced GALAH stars, what do we have in common?
  - 32 FLAMES stars
  - 15 UVES stars



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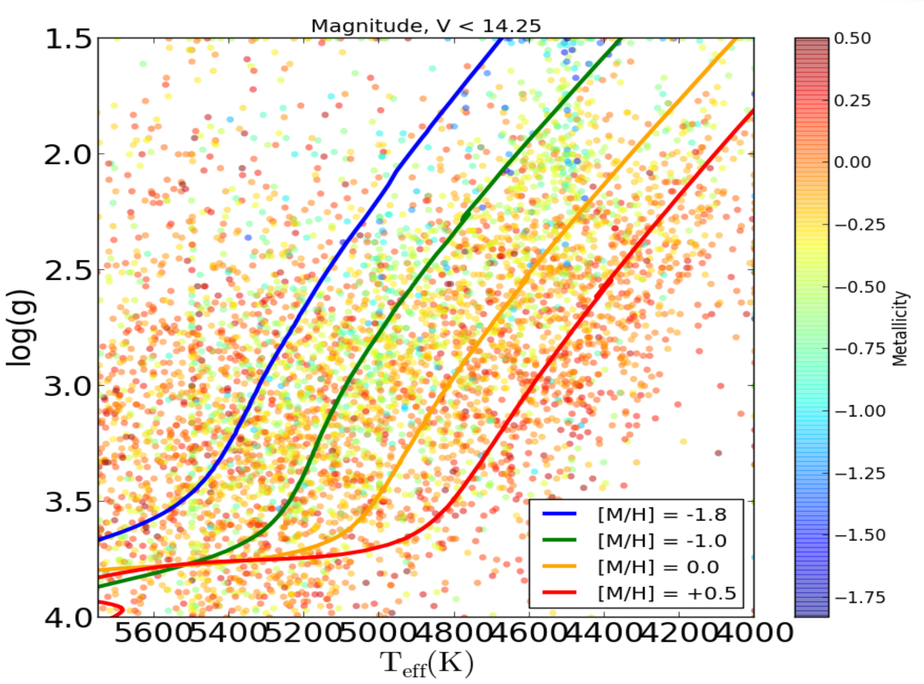
- We have run 7589 stars through the Theremin pipeline, as a test



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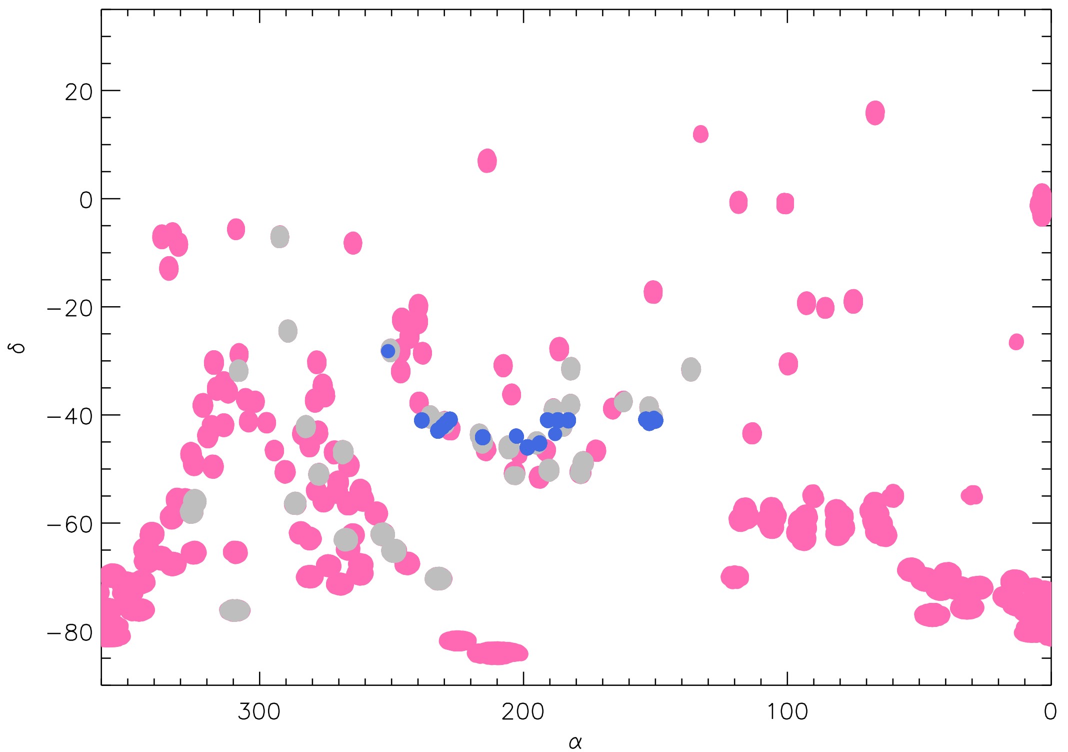
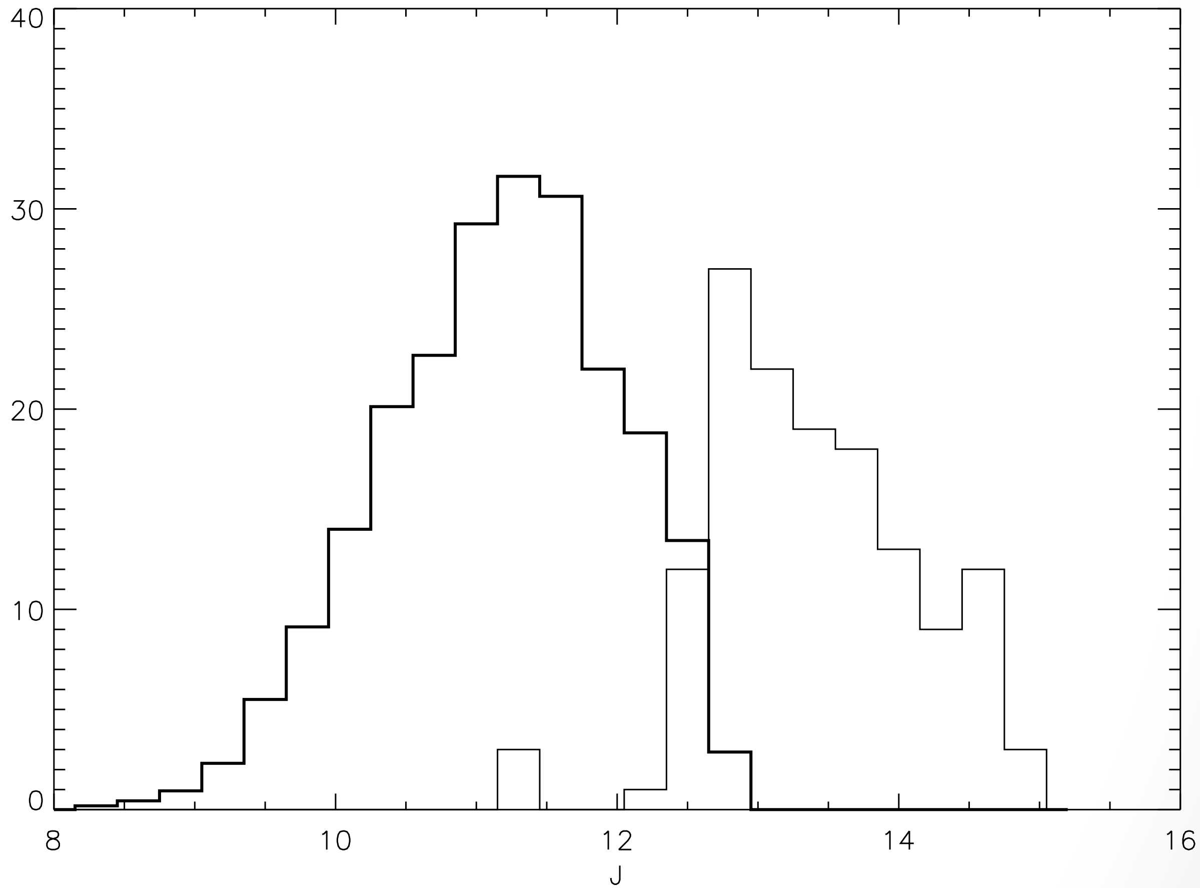


GES plus GALAH

- We have run 7589 stars through the Theremin pipeline, as a test
  - 2 of these are in iDR2
  - 1750 iDR2 stars are in the same line of sight as the preliminary Theremin stars
- This allows direct comparisons (very good for testing!) but also a search for trends (since we sample to different depths with the same type of star)

GES plus GALAH

- Using those "line of sight" stars, find high complementarity



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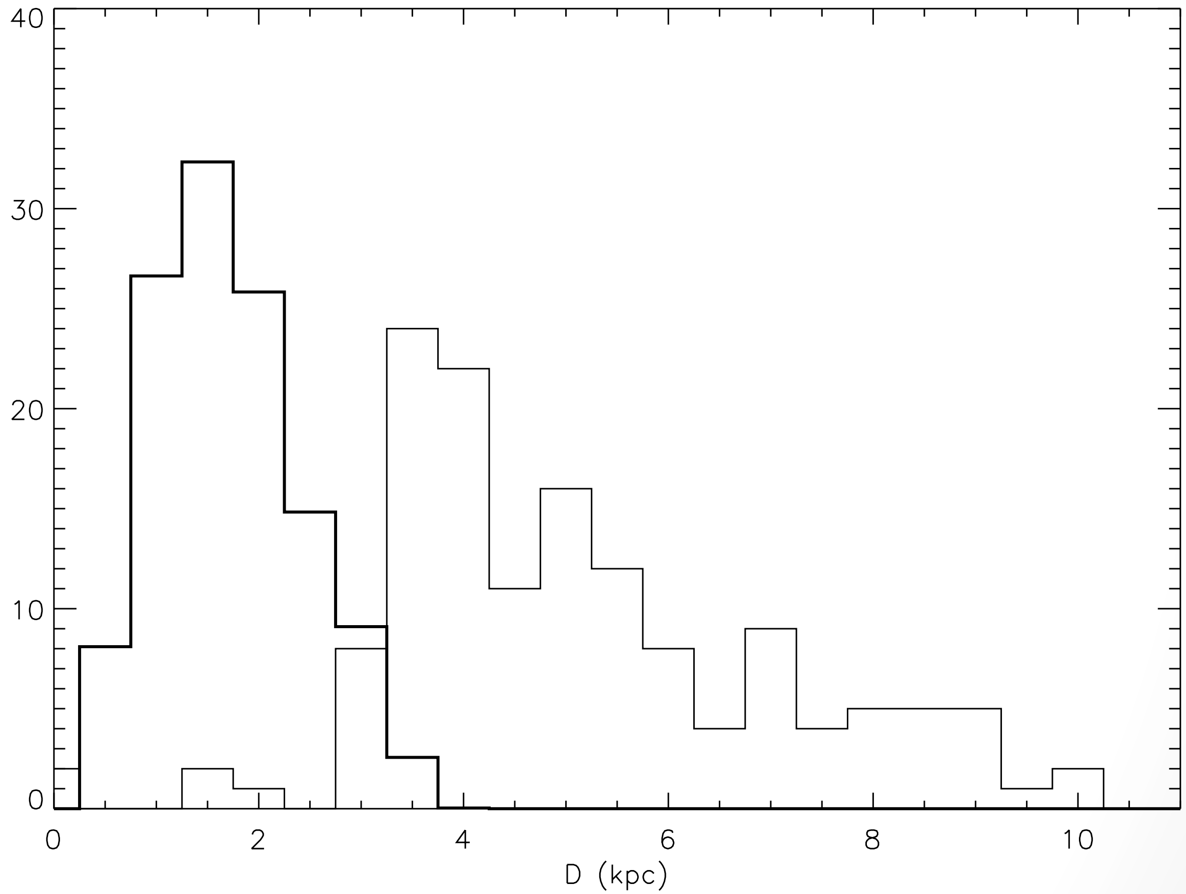

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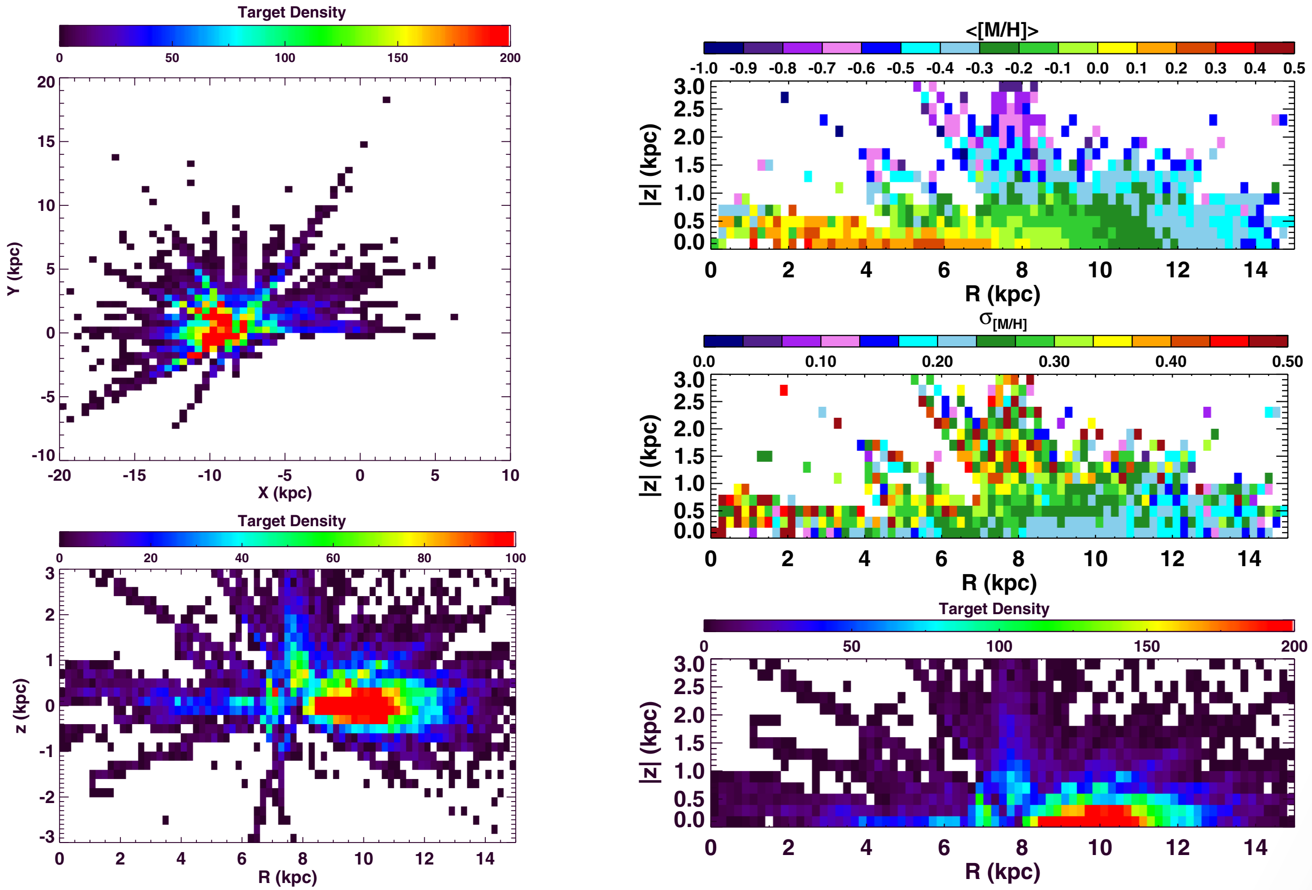

In summary

- GALAH and GES: designed differently, very complementary
- GALAH: proceeding well
- Combining the data sets: makes new possibilities