MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
Cofinanciado por la Unión Europea
AGENCIA ESTATAL DE INVESTIGACIÓN
Centro de Estudios de Física del Cosmos de Aragón
CEFCA

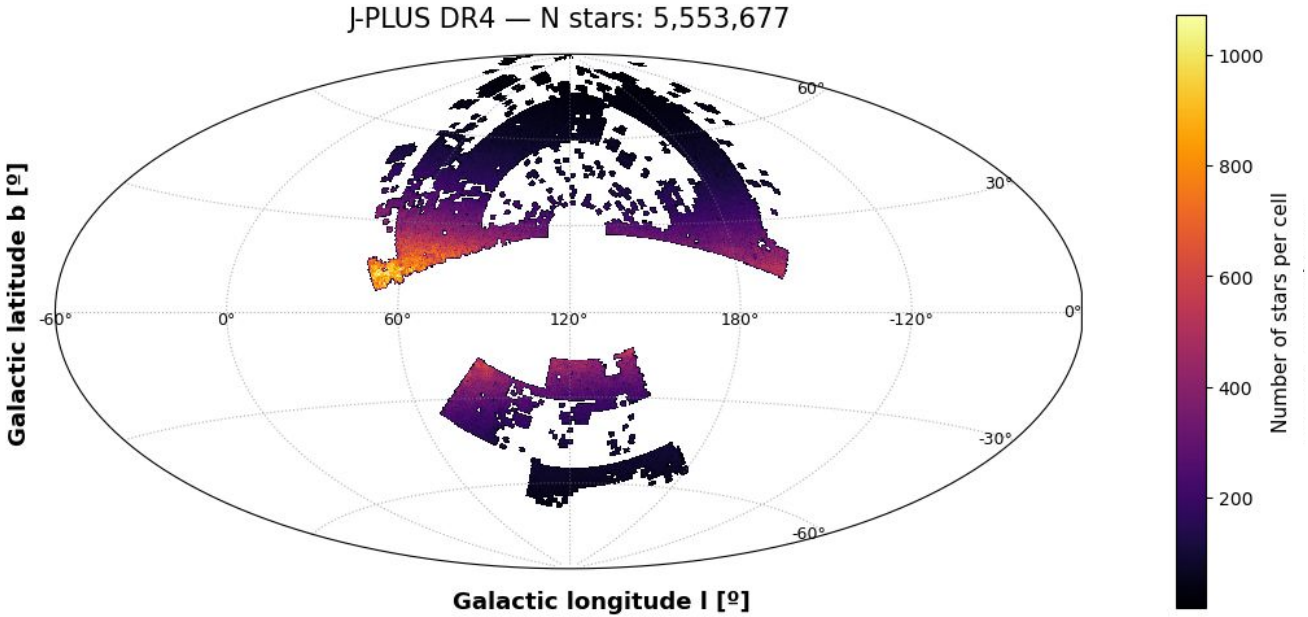
Stellar Parameters Using J-PLUS DR4 Photometry and Gaia Parallaxes via PCA

Adrián Hidalgo Pinilla

Andrés del Pino Molina, Carlos López San Juan and Jairo Andrés Alzate Trujillo

Our Sample

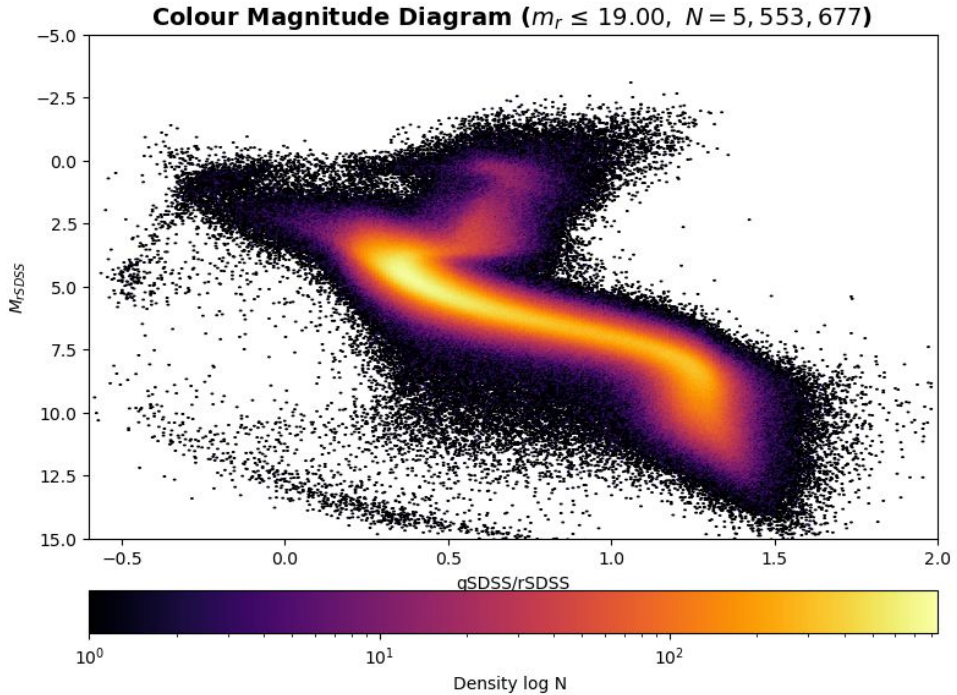
- Data from JPLUS DR4 cross-match with astrometry from Gaia DR3.



GaiaNIR: Adrián Hidalgo Pinilla (ahidalgo@cefca.es)

Our Sample

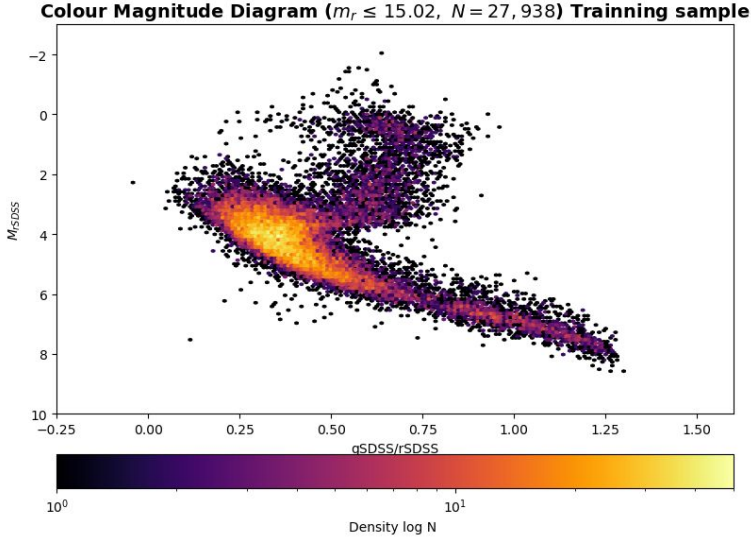
- Data from JPLUS DR4 cross-match with astrometry from Gaia DR3.

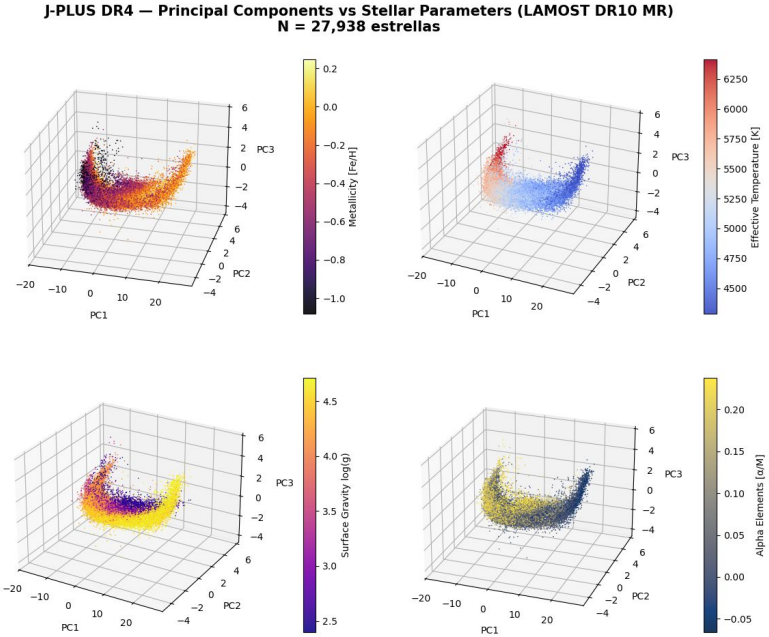


GaiaNIR: Adrián Hidalgo Pinilla (ahidalgo@cefca.es)

Principal Components Analysis (PCA)

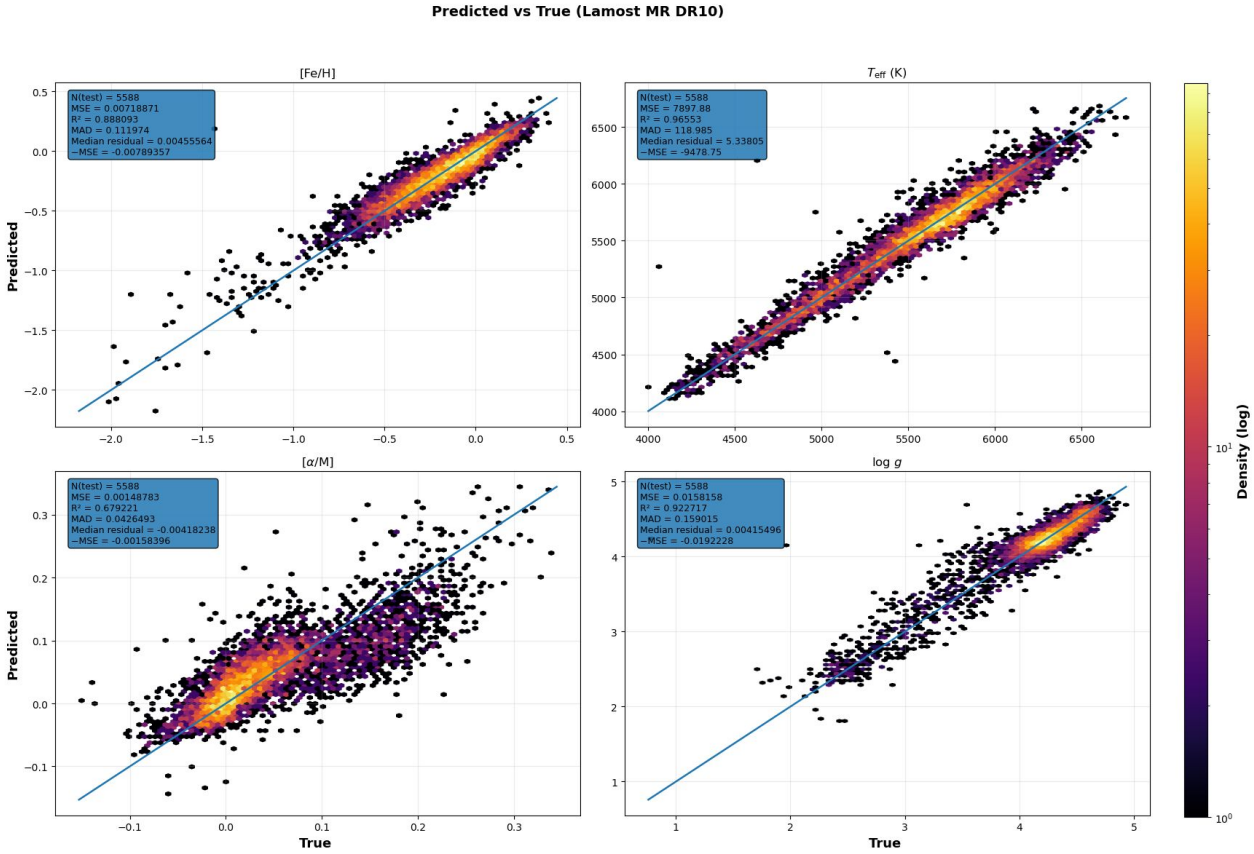
PCA(Photometry(66 Colours) + Distance Modulus from Gaia) → Nine Principal Components → Polynomial fit



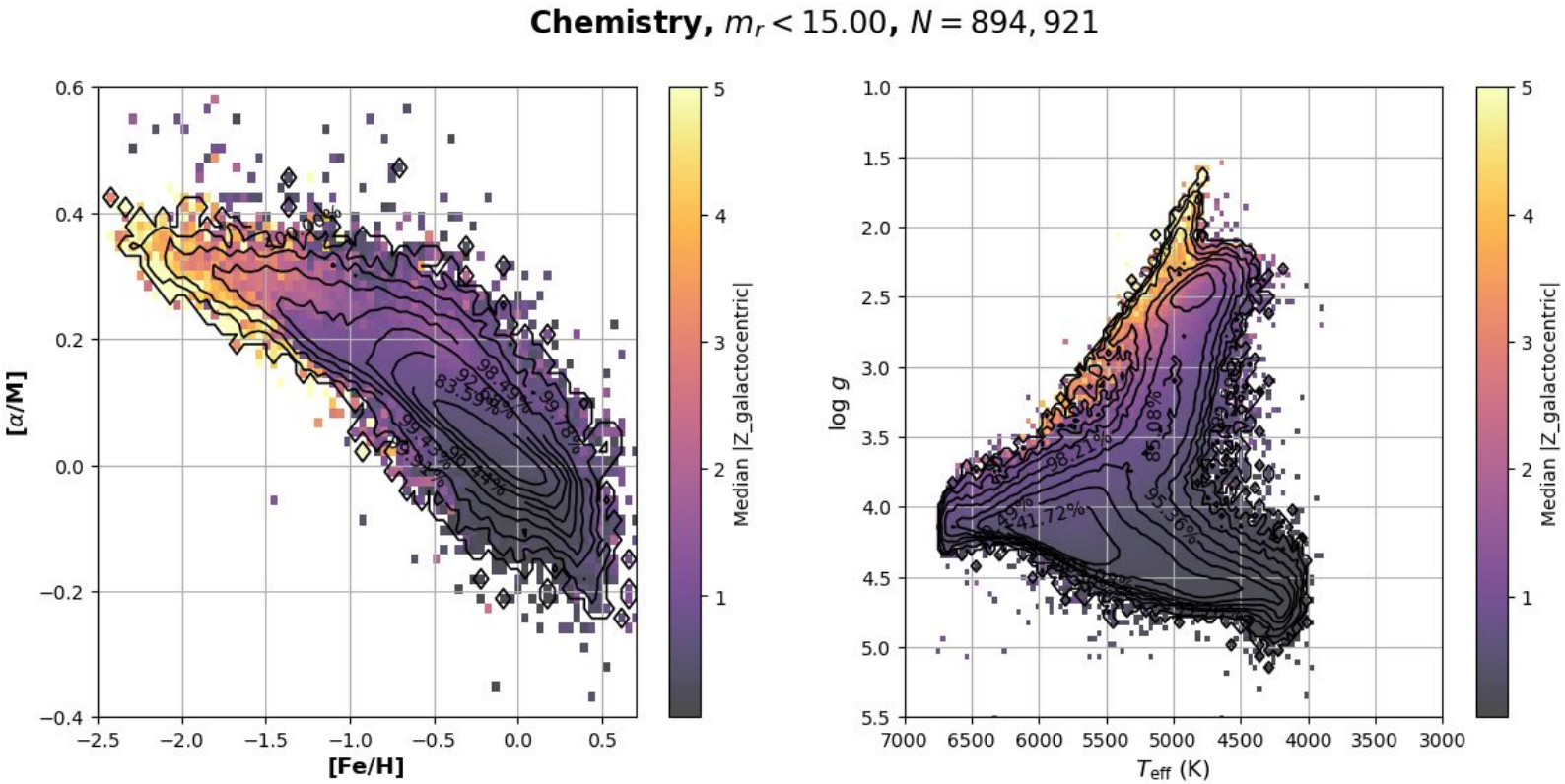


GaiaNIR: Adrián Hidalgo Pinilla (ahidalgo@cefca.es)

Comparative: Stellar parameters predict vs Lamost



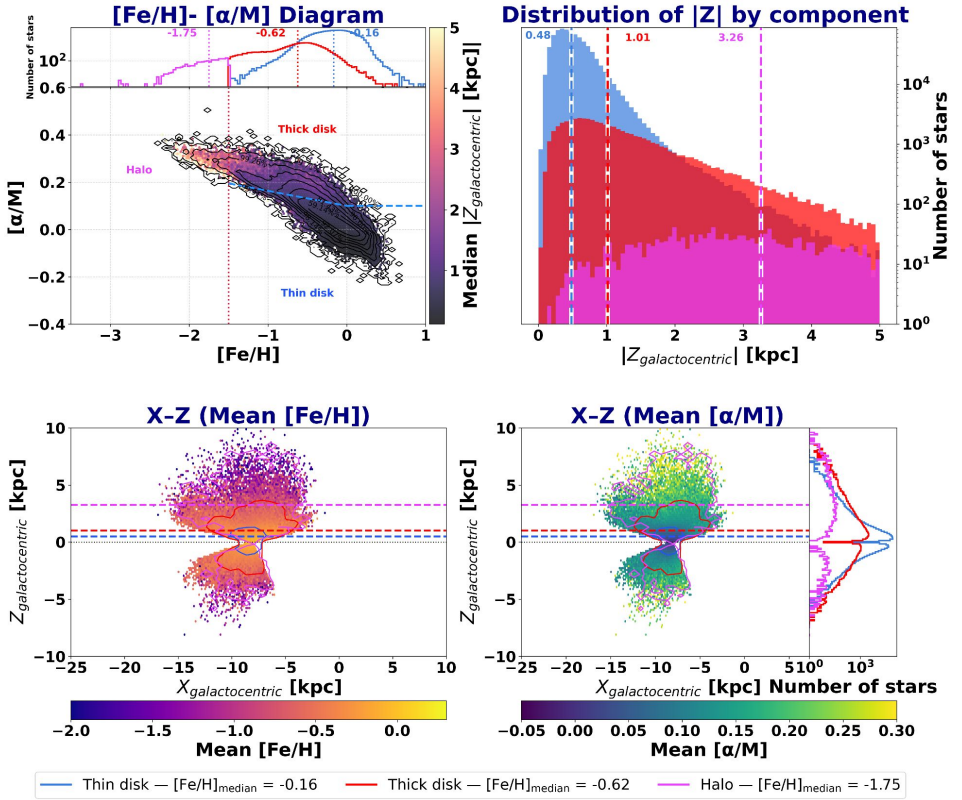
Stellar parameters predict



GaiaNIR: Adrián Hidalgo Pinilla (ahidalgo@cefca.es)

Milky Way Components

- A split is performed on the metal–alpha panel.
- It is possible to identify qualitatively the Milky Way's components.
- Expected distribution for metallicity and alpha-element.



GaiaNIR: Adrián Hidalgo Pinilla (ahidalgo@cefca.es)

Conclusions

We achieve an accuracy comparable to that of low-resolution spectroscopy.

These models can be applied to any photometric survey.

Obtaining a large sample of alpha-rich and metal-poor stars

Will facilitate the search for stellar streams in these samples using clustering algorithms.

If you have any questions, please feel free to ask me afterwards.

Parallax

$$(\varpi - \Delta\varpi) \,/\, \sqrt{(\sigma^2{}_{\text{parallax}} + \sigma^2{}_{\text{sys}})} \geq 5$$

- $\Delta\varpi = 0.017$ mas (Gaia DR3 zero-point offset)
- σ_{parallax} = individual parallax uncertainty
- $\sigma_{\text{sys}} = 0.015$ mas (adopted systematic error)

Stellar parameters predict