Probing the ultracool dwarf population around the Horsehead nebula

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Brown Dwarfs Keep their Cool: 30 Years of Substellar Science
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The Horsehead Nebula

- Nearby (~400 pc)
- Young objects
- Active star formation
- Complex structure
- Well-studied

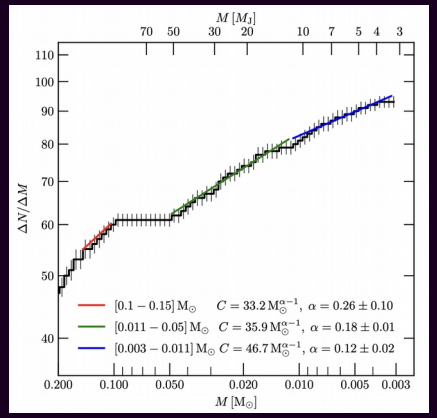
ESA/Euclid/Euclid Consortium/NASA,
image processing by J.-C. Cuillandre G. Anselmi

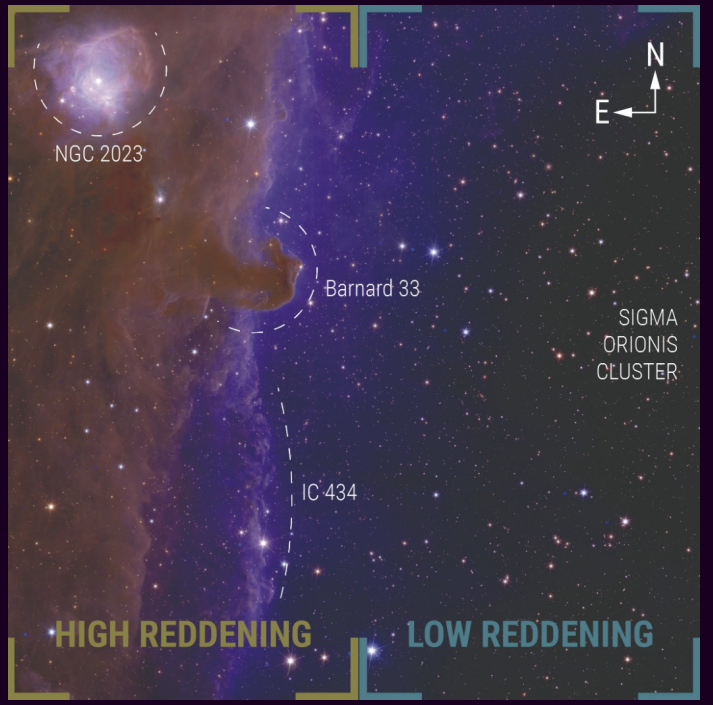
The Horsehead Nebula

1st ERO Substellar paper:
Showcase of Euclid's potential

σ Orionis
Substellar
IMF

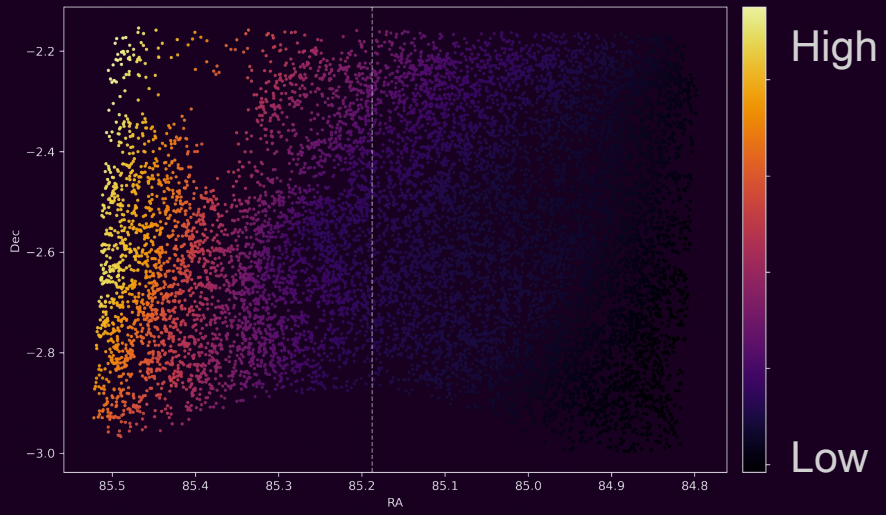
see talk by M. Zerjal





Martín et al. 2025

High reddening region



Currently available dust maps are low-resolution

⇒ Use lower limits to constrain UCD candidates

Scientific outlook

Addressing the stellar-to-substellar ratio, especially with respect to this field's complex morphology

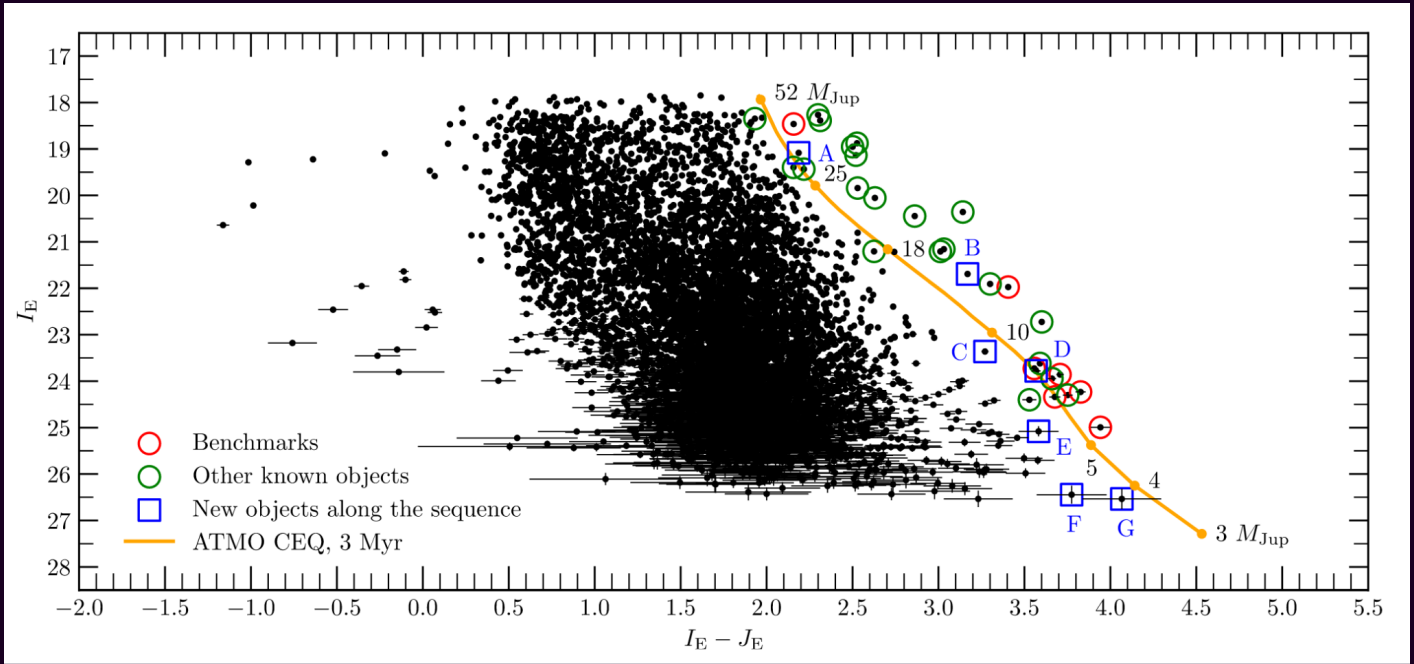
Probing the star formation history in this field

Extending the very low mass IMF of the region, comparing with the σ Orionis substellar IMF

Constraining UCD candidates

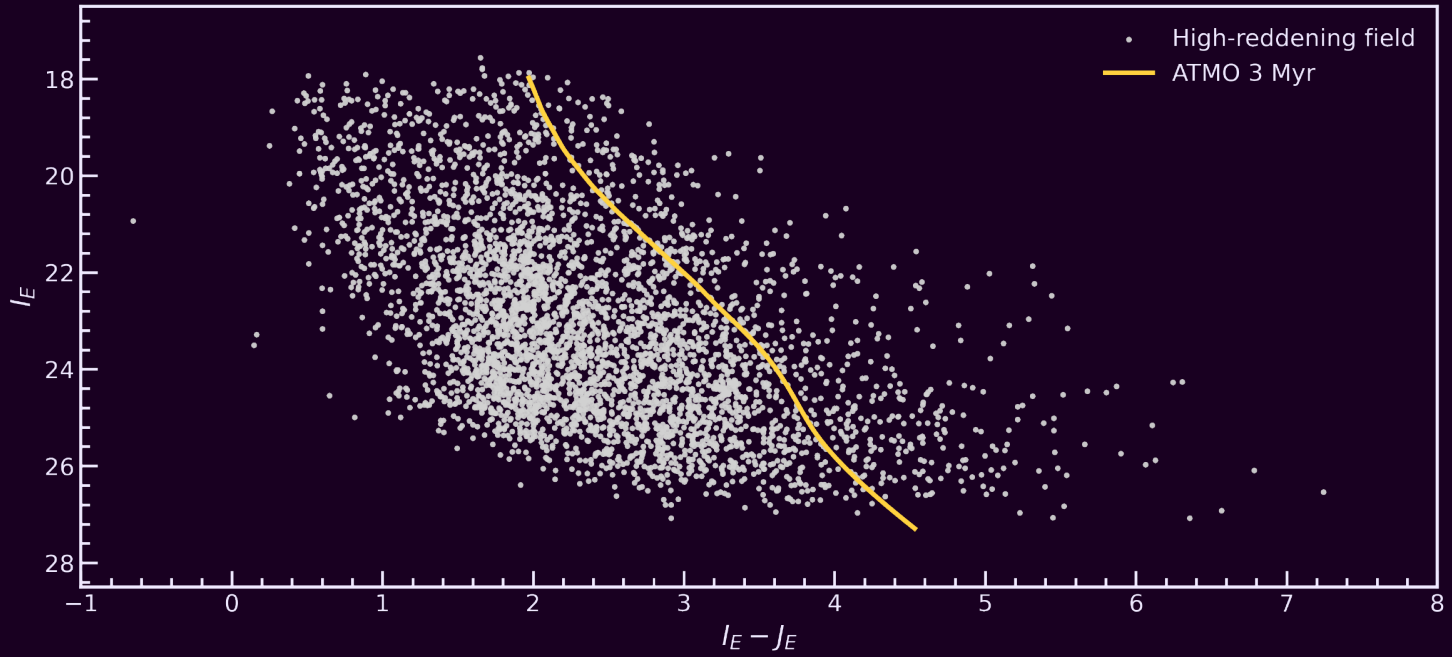
Denebulized catalog
Renewed filtering criteria
Combine with ancillary data (Spitzer)
Use ATMO 3 Myr isochrone

Constraining UCD candidates

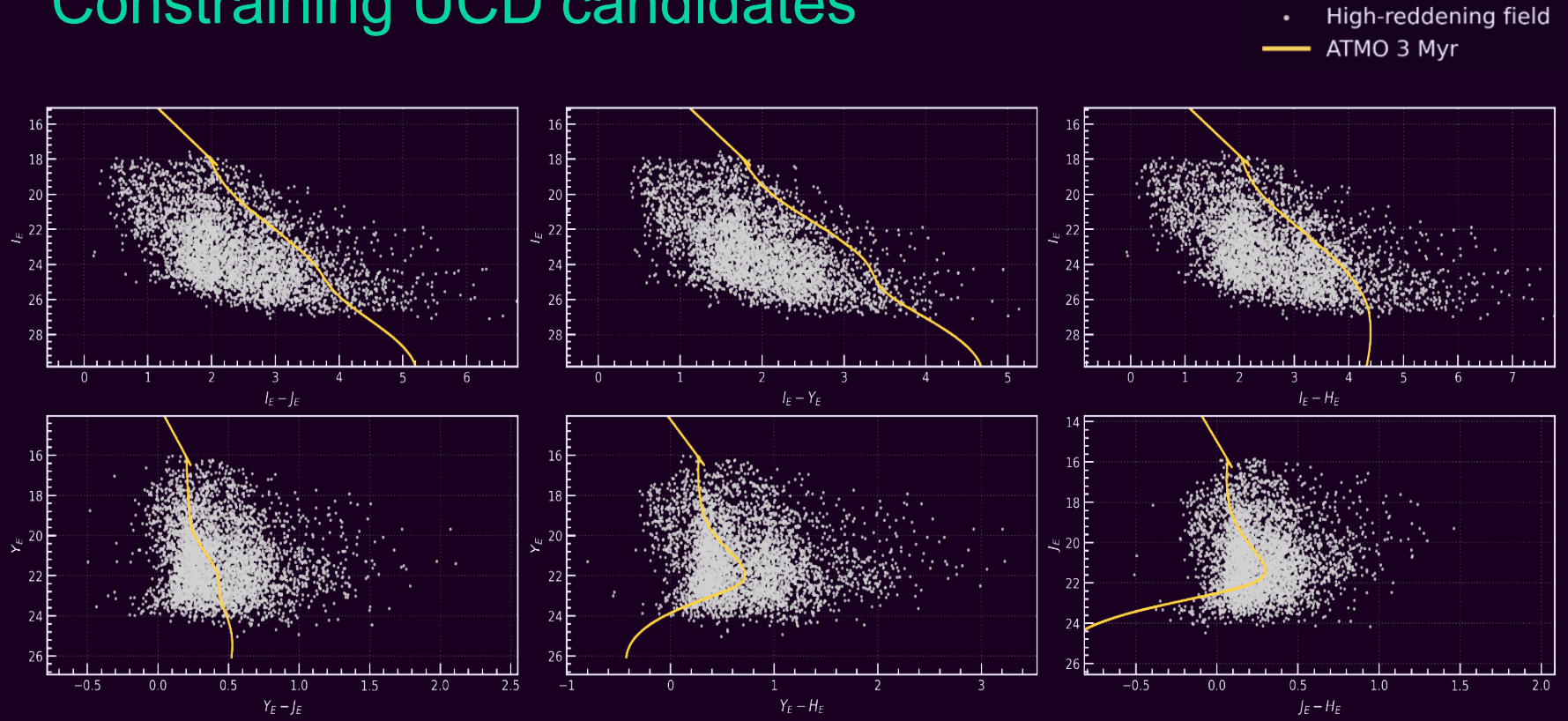


Martín et al. 2025

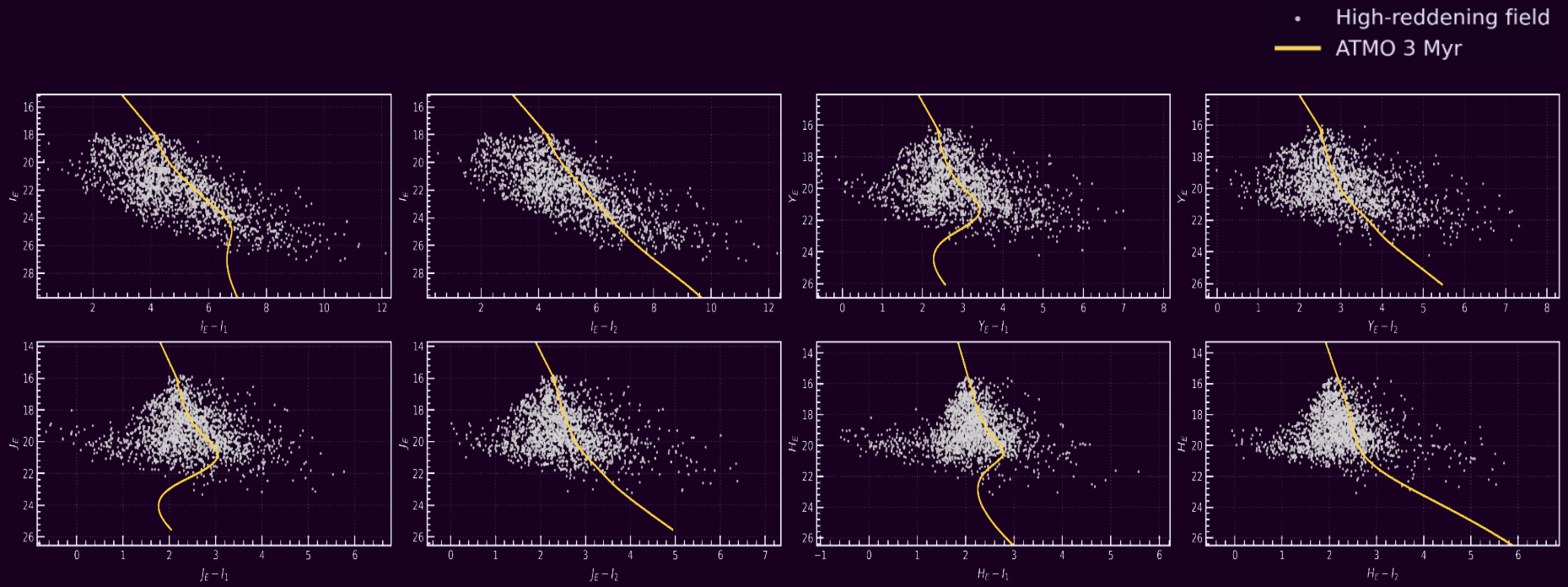
Constraining UCD candidates



Constraining UCD candidates



Constraining UCD candidates



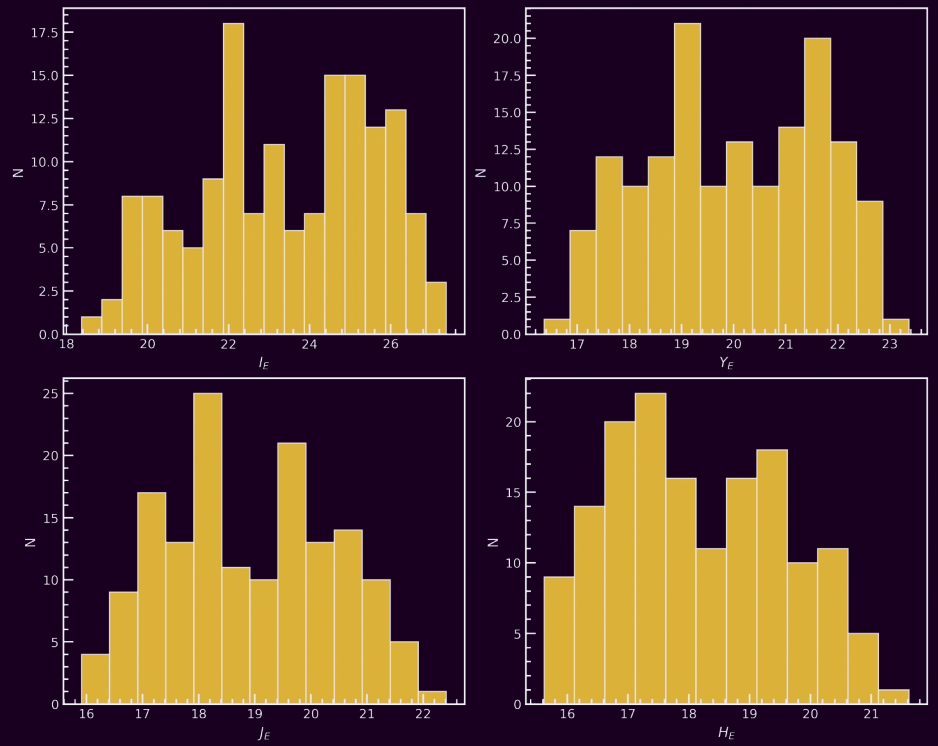
Constraining UCD candidates

Denebulized catalog
Renewed filtering criteria
Combine with ancillary data (Spitzer)
Use ATMO 3 Myr isochrone

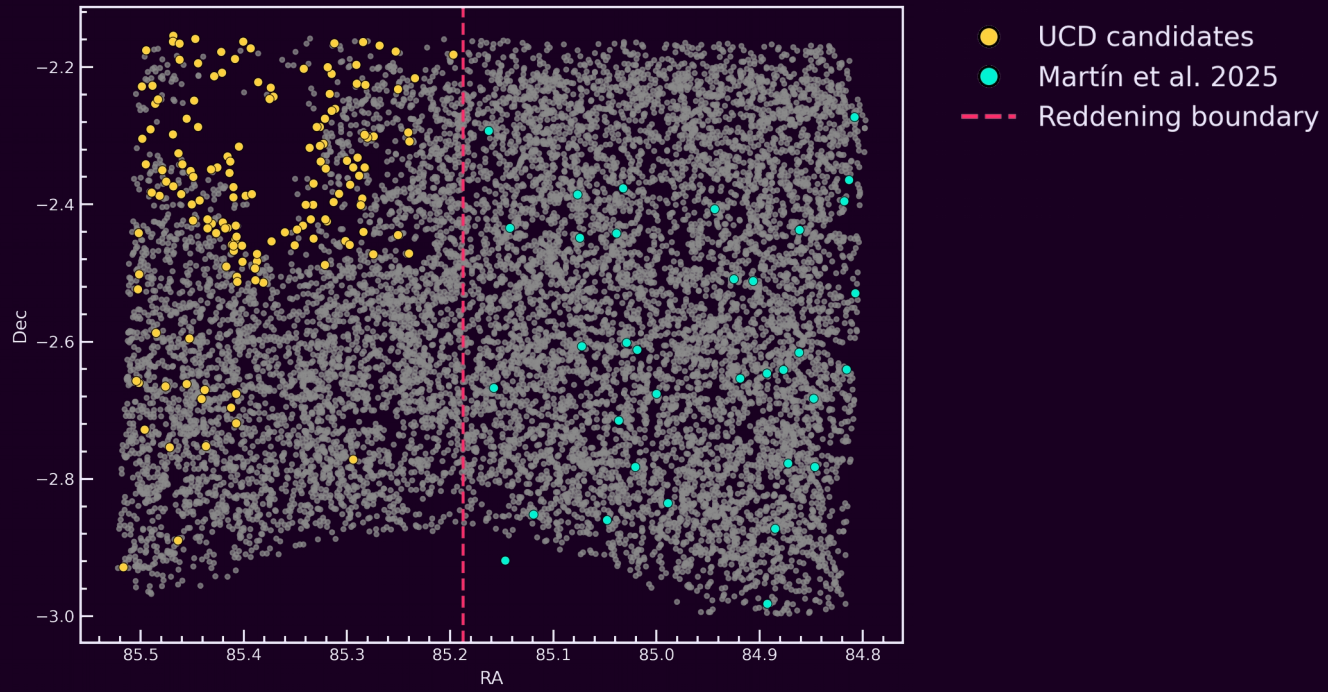
⇢ choose objects to the right of the isochrone, in every isochrone where they appear

153 candidates

Studying UCD candidates



Studying UCD candidates



Summary & Preliminary results

1. New UCD candidates in the high-reddening region of the Euclid ERO (σ Orionis/Horsehead) field
2. Spatial clustering, unlike UCD candidates the low-reddening region
3. Potentially distinct formation mode
4. Spectroscopy coming soon!

Thank you!

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