



Contribution ID: 30

Type: **Contributed talk**

Searching for rogue planets around the Horsehead nebula

Tuesday, December 16, 2025 2:40 PM (20 minutes)

Euclid's capabilities to study ultracool dwarfs (UCDs), including brown dwarfs and free-floating planetary-mass objects, have already been demonstrated by its Early Release Observations. UCD candidates have been uncovered down to ~ 4 MJup in the σ Orionis cluster, a young (~ 3 Myr) and nearby (~ 400 pc) star-forming region. The first search in this field was focused on low-reddening areas, while the adjacent high-reddening regime — shaped by the Orion B molecular cloud edge, including the Horsehead Nebula and NGC2023—remains largely unexplored in Euclid data.

In this work we extend substellar searches into these complex dusty environments by combining Euclid photometry with complementary infrared datasets. Using refined color–magnitude criteria, we identify new UCD candidates down to the planetary-mass regime in these regions of strong and variable extinction. Preliminary results reveal clustering in the spatial distribution of this embedded population, contrary to UCDs in the low-reddening region. These findings suggest ongoing substellar formation and highlight a potentially distinct formation mode in the dusty outskirts of σ Orionis, influenced by ionization fronts, feedback mechanisms and interactions with the surrounding molecular cloud. Characterizing this population will provide input for understanding how local environment might shape the very low-mass end of the initial mass function.

Primary authors: TSILIA, Styliani; ŽERJAL, Maruša (Institute of Astrophysics of the Canary Islands); MARTÍN GUERRERO DE ESCALANTE, Eduardo Lorenzo (Universidad La Laguna); Prof. BOUY, Hervé (Université de Bordeaux, LAB); DOMINGUEZ-TAGLE, Carlos (Instituto de Astrofísica de Canarias (IAC))

Presenter: TSILIA, Styliani

Session Classification: Euclid

Track Classification: In-person