

Title:

M/L/T Dwarfs detected with Euclid

Abstract:

The deep, near-infrared coverage of EUCLID of most of the sky out of the plane of the Milky Way allows it to map in great detail the position and densities of red and brown dwarf stars and substellar objects. In similar quality data, using the Hubble Space Telescope, it has already been shown that the shape of the Milky Way thin and thick disk, and stellar halo can be very well constrained using a 3D representation of the dwarfs together with an MCMC approach (van Vledder+ 2016). The EUCLID filter combinations are sufficient to classify stars into M-, L-, T- or even Y-dwarf substellar objects. To quantify their type further some follow-up is required: EUCLID proper motion, grism spectra or JWST imaging. However, EUCLID imaging data alone will be enough to identify halo substructures using these objects in them.

JWST/NIRcam imaging, with its unique suite of filters is sufficient to discriminate between subtypes of the substellar objects. With subtype (and hence distance) determined, one can map the scales of the Milky Way. Taking this a step further, one can compare our understanding of the star-formation history of the Milky Way, cooling curves of brown/red dwarfs (a progression along subtype) and the kinematic heating of these objects over time, expanding their vertical distribution in the disk.

A lot of the science with brown/red dwarfs with EUCLID and JWST will be bonus science, piggybacking on the extragalactic surveys. I will discuss which filter combinations work well for identification and subtyping these faint stars and substellar objects, which science questions can be answered with them and how their identification can help with both missions' success in their primary goals.