

P123a **Mass function to below the deuterium burning mass limit of young clusters in the outer Galaxy. JWST NIRCам/MIRI imaging of Digel Cloud 2 clusters**

Chikako Yasui(NAOJ), Natsuko Izumi (ASIAA), Ryan M. Lau (NOIRLab), Masao Saito (NAOJ), Michael Ressler (JPL/Caltech)

Outer regions of spiral galaxies, such as our Galaxy, are known to be generally in low metallicity environments (~ -1 dex), roughly comparable to values in the primordial environments of the universe ($z \approx 2$). Nonetheless, the relatively close distance of the outer Galaxy makes it the only environment suitable for spatially resolved observations of individual stars, as is the case in the solar neighborhood. We have been conducting near-infrared imagings with the Subaru Telescope of ~ 10 young star-forming clusters in the outer Galaxy down to $\sim 0.1 M_{\odot}$ stars, showing that the initial mass function (IMF) in such environments is not significantly different from typical IMFs seen in the solar neighborhood in terms of the high-mass slope.

We performed high-sensitive NIRCам/MIRI imaging observations of two star-forming clusters in Digel Cloud 2, a star-forming region in the outermost Galaxy ($R_G > 15$ kpc), and succeeded a mass detection limit of $\simeq 0.05 M_{\odot}$. This is the first detection of brown dwarfs in star formation clusters under such an environment. The underlying IMFs are derived by model fitting of the obtained K -band luminosity function (KLF), resulting in IMF peak mass $\log M_C/M_{\odot} \simeq -1.1$ for both clusters. Although the uncertainties are rather large ($\simeq 0.7$), the results suggest that the M_C is somewhat lower than previously derived values in the solar neighborhood ($\log M_C/M_{\odot} \sim -0.5 \pm 0.5$). We will discuss the possible environmental effects obtained here in this talk.