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Radiative feedback and final stellar masses in low-metallicity environments

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In massive star formation, the radiative feedback is a key process in general because it potentially halts the accretion flow to limit the stellar masses. Previous studies show that the UV feedback, the dynamical expansion of an HII region and photoevaporation of a circumstellar disk, plays such a role in the primordial star formation(e.g.,McKee & Tan 2008; Hosokawa et al.2016). However, it is unknown how effects of the radiative feedback vary with increasing the metallicity. Semi-analytic models predict that the presence of dust grains qualitatively modifies how the radiative feedback operates (e.g.,Fukushima et al.2018).

In this talk, I present our recent 2D radiation-hydrodynamic simulations of the massive star formation at various metallicities, aiming to understand the variation of the radiative feedback strength and resulting final stellar masses. Our early results already show some interesting features. The UV feedback becomes weak with increasing the metallicity, owing to the dust attenuation of ionizing photons. The radiation pressure exerted on dust grains gets stronger instead to become the dominant feedback at $Z > 0.01 Z_{\odot}$. However, strength of the radiation-pressure seems limited for cases where the mass accretion occurs through the circumstellar disk. The resulting star formation efficiency thus may be higher with the higher metallicities.

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Talk/Poster

Talk

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