Modeling dust for simulated galaxies at Cosmic Noon

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The galaxy luminosity function, i.e. the galaxy count per brightness/magnitude bin, is a crucial probe of star formation rate evolution across cosmic times. At Cosmic Noon ($z \sim$ 2-4), galaxies not only have had enough time to accumulate dust, but they also see a peak in their star formation rates. These two aspects together mean that dust present in the star-forming regions of these galaxies can substantially absorb the UV radiation emitted by young and massive stars of this galaxy. Numerical simulations are a great tool to obtain the galaxy luminosity function at various cosmic epochs but the effects of dust have to be delicately and faithfully handled if we want to focus our efforts on galaxies in the Cosmic Noon.

To make this possible, I use data from the HELLO suite of cosmological zoom-in simulations and post-process cosmic dust via the SKIRT radiative transfer code. These simulations contains hundreds of sub-Milky Way and Milky Way mass galaxies between $z \sim$ 2-4. Assuming an observationally motivated dust-to-gas ratio, a dedicated SED library for young stellar populations and a chemical composition for the dust, I model cosmic dust in the simulated galaxies and forward model them through a pipeline to mimic JWST observations. I also study the effects of galactic viewing angle on the dust attenuation and energy balance. Finally, I present some motivation to adopt an updated SED library for young stellar populations that promises to improve the match with observed galaxy colors.