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Trouble in the early Universe: why is it so dusty out there?

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An increase in the observation facilities in the last two decades, from the UV to far-infrared and sub-millimeter, has motivated a multi-wavelength approach to studying the Universe. With higher resolution and in-depth surveys of the sky, we are now able to study distant galaxies and estimate their physical parameters, e.g. star formation Rate (SFR), stellar mass and dust mass by "looking back in time". In this work, we build a catalog of Dusty Star-Forming Galaxies (DSFGs) located at a redshift of $1.9 < z < 6.9$, when the Universe was between 0.8 and 3.5 Giga years old, by cross-matching the existing data from the UV to the far-infrared, and we derive their physical parameters. The information derived allows us to probe the baryon evolution of these galaxies by using chemical evolution models. In particular, we test the hypothesis of different Initial Mass Functions (IMFs) of stars, which affect the chemical enrichment of the interstellar medium of galaxies as well as the derivation of the physical parameters of galaxies.

Presenter(s) : Mr SAWANT, Prasad (National Centre for Nuclear Research, Poland)