Dust in high redshift galaxies

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Abstract

ALMA observations have revealed the presence of dust in galaxies in the Epoch of Reionization. However, the dust temperature, Td, remains unconstrained thereby introducing large uncertainties, in the derived dust masses, total infrared luminosities, obscured star formation fraction. We present new results showing a trend of increasing dust temperature in actively star forming regions of early galaxies, mostly driven by the compact and turbulent nature of these systems. A higher Td has testable implications: (a) it reduces the tension between local and high-z IRX-β relation, (b) it alleviates the problem of the uncomfortably large dust masses deduced from observations of some EoR galaxies. Our study also physically motivates the empirical relation recently found between molecular gas mass, and [CII]158 um luminosity. It has relevant applications in the context of recent ALMA large programs targeting high redshift [CII] emitters, such as REBELS, and ALPINE. In my talk, I will review these issues and sketch solutions for the remaining challenges.

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