Investigating the origin of dust in galaxies using Dusty SAGE

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Abstract

I will describe a new model for dust evolution in a semi-analytic model for galaxy formation, Dusty SAGE. We follow the condensation of dust in stellar ejecta, grain growth in molecular clouds, destruction by supernovae shocks, and the removal of dust from the ISM by star formation, reheating, inflows and outflows. We find that there is a shift of dominance in the origin of dust at redshift 3, from the stellar production to grain growth in the ISM. The shift is reflected in the scaling relations of dust-to-gas and dust-to-metal ratios. We find a decline in DTG and DTM scaling relations for galaxies that produce most of their dust in stellar ejecta and a sharp increase for those with grain growth as the dominant production mechanism.

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