

Dust grain growth in the interstellar medium of galaxies at redshifts $4 < z < 6.5$

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To discriminate between different dust formation processes is a key issue in order to understand its properties. We analysed six submillimeter galaxies at redshifts $4 < z < 5$ and nine quasars at $5 < z < 6.4$. We estimated their dust masses from their (sub)millimeter emission and their stellar masses from the spectral energy distribution modelling or from the dynamical and gas masses obtained from the CO line detections. We calculated the dust yields per AGB star and per SN required to explain these dust masses and concluded that AGB stars are not efficient enough to form dust in the majority of these galaxies. SN could be responsible for dust production, but only if dust destruction in the SN shocks is not taken into account. Otherwise even SNe are not efficient enough, which advocates for some other dust production mechanism. We present the hypothesis that grain growth in the interstellar medium is responsible for bulk of the dust mass accumulation in these galaxies.

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