Curious diffuse dust emission detected in a galaxy group at $z \sim 3$

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Abstract

We report the results from deep ALMA 870um observations of a high redshift galaxy group, RO-1001, at $z=2.91$. With this we build on previous findings of star formation rates $\sim 1200$ Msol/yr, having improved our detection capabilities down to $\sim 10$ Msol/yr. This allows us to have a more complete understanding of the rapid galaxy evolution expected at such redshifts and complements the recently published search for cold-flow accretion using Ly-alpha dynamics. We primarily detect extensive faint diffuse dust substructures that could be suggestive of accretion driven star formation or could point to tidally stripped gas from mergers. Whatever be the case though, this would have substantial impact on our understanding of galaxy cluster progenitors. Furthermore, by studying the morphology of the brightest member galaxies, we attempt at shedding light on galaxy evolution at high redshifts. Finally, we investigate the origins of the radio excess reported in one of the star-bursting member galaxies and hence explore aspects of possible feedback within RO-1001.

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