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Utilizing idealized setups for a targeted investigation of formation pathways of dwarf galaxies

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Observations of interacting galaxies in a cluster environments indicate that the triggered star formation activity inside the tidal tails is extending far beyond what we would expect from mergers in the field. Allowing to probe the possible parameter space, isolated setups are posing as the ideal testing ground to investigate the details and consequences of such behavior, as well as for a targeted examination of observed objects. Utilizing the code OpenGADGET-3, I present three hydrodynamic simulations of a major merger inside a galaxy cluster in high resolution, where the initial conditions were tuned to correspond to the observed merger NGC 5291 in cluster Abell 3574. Compared to isolated galaxy merger simulations, I find strong changes in the merger morphology, as well as drastically increased star formation activities due to ram pressure. In particular, this environmental influence is efficiently assisting the formation of tidal dwarf galaxies, which form in the pre-enriched gas ejected by the merger. By comparing our simulations to observational data, I demonstrate that such a process is capable of reproducing characteristics of a full variety of observed dwarf galaxy types. Comparing their contribution to the observed galaxy mass function in clusters, I estimate that ~30% of dwarf galaxies in galaxy cluster environments may have been formed through stripping from mergers.

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