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Morphology and star formation implications of the presence of a CGM during galactic interaction

Observational data constraints from the eROSITA mission have estimated X-ray surface brightness profile ranges of the gas in the circumgalactic medium (CGM) in M31-like and Milky Way-like galaxies. Temperatures and gas density from similar galaxies in the Illustris TNG simulation have also been characterized. During a galactic interaction, it is possible that the presence of a CGM may affect the morphology and star formation rate of satellite galaxies, due to ram pressure stripping. In order to quantify the given effects and its correlation with different CGM densities, using hydrodynamical N -body simulations, three simulations were performed with the same orbital configuration (pericentric passage of 200 kpc), two CGM gas masses, based on plausible parameters from observational X-ray surface brightness profiles from eROSITA mission, as well as temperatures and densities consistent with constraints from Illustris TNG ($4 \times 10^{10} M_{\odot}$ and $36 \times 10^{10} M_{\odot}$), and the case of the interaction in the absence of a CGM. Preliminary results reveal a mild increase in star formation rate on the simulation with a denser CGM, when compared to the situations of a less denser CGM and the absence of it. In the presence of a CGM during the interaction, the gaseous disk has lost mass due to morphological formation of a tail (which was more pronounced in the case of the denser CGM) while the absence of a CGM implied on a preservation of gaseous disk mass and morphology.

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