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The influence of the mass and orbital radius of a satellite on the strength of the bar of a galaxy

Bars are important structures in spiral galaxies and can suffer changes with the close passage of satellites. We aim to analyze the difference between the bar strength of an isolated galaxy and the bar strength of the same galaxy being orbited by satellites. In this study, we use Gadget-4 simulations of a Milky Way-like galaxy and dwarf galaxies of varying masses (0.1 × 10ˆ10 M⊠ , 0.5 × 10ˆ10 M⊠ and 1 × 10ˆ10 M⊠) and orbital distances (10, 20 and 30 kpc). We find that low mass satellites do not change the bar strength, satellites of intermediate mass weaken the bar, and high mass satellites can destroy it. Also, the radius of the satellites'orbit determines whether the change in bar strength will happen sooner or later.

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