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## HI Size–Mass: MIGHTEE-HI vs TNG50

Scaling relations provide insight into galaxy evolution. While the Tully-Fisher relation may be one of the most well known HI-based scaling relations. A fundamental scaling relation for disc galaxies is the HI size mass relation. This relation shows a tight correlation between the diameter of a HI disc,  $D_{HI}$ , and its enclosed HI mass,  $m_{HI}$ . The correlation suggests a somewhat constant HI surface density within the  $D_{HI}$  for most galaxies. This applies to galaxies regardless of their morphology, mass or environment. Thus hinting that all gas-rich galaxies experience a similar evolutionary process. In this work we present the HI size-mass relation for simulated galaxies from the TNG50 cosmological simulation. We compare it to the observational results from the MIGHTEE-HI survey. IllustrisTNG is a suite of cosmological magnetohydrodynamical simulations of different volumes and resolutions. In our work we use TNG50, which is the most computationally expensive and highest resolution realization of the IllustrisTNG simulation project. MIGHTEE-HI is the neutral hydrogen (HI) emission project within the MIGHTEE survey. This is one of the first deep, blind, medium-wide interferometric surveys for HI. The project aims at extending our knowledge of HI emission up to  $z = 0.6$ . Our goal is to investigate to which degree the TNG50 galaxies follow the observational results, and to predict the cosmic evolution in the HI size-mass relation to be expected when the MIGHTEE-HI survey will be completed to full depth.

### Apply to be considered for a student ; award (Yes / No)?

yes

### Level for award;(Hons, MSc, PhD, N/A)?

PhD

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