

Measuring Galaxy Merger Rates up to $z \sim 3$ in the CANDELS fields using IllustrisTNG data and CNNs

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Overview

Merging is potentially the dominate process in galaxy formation, yet there is still debate about its history over cosmic time. To address this the authors classify major mergers and measure galaxy merger rates up to $z \sim 3$ in all five CANDELS fields using CNNs trained with simulated galaxies from the IllustrisTNG cosmological simulation. It is shown that the model can achieve 90% accuracy when classifying mergers from the simulation, and has the additional feature of separating two types of mergers. They compare the machine learning classifications on CANDELS galaxies with visual merger classifications from Kartaltepe et al. 2015, and show that they are broadly consistent. Finally, they demonstrate that galaxy merger rates measured by the model are consistent with results found for CANDELS galaxies using close pairs statistics.

