Contribution ID: **239**   Type: **not specified**

Toward a deep learning approach for fast galaxy generation

Thursday, 11 July 2024 12:10 (20 minutes)

Numerous missions are currently collecting enormous amounts of cosmological data, and the near future will only bring more. Providing theoretical predictions to match with observations is key to constraining cosmological parameters. Recently, simulations have gotten extremely detailed and accurate; however, these simulations are computationally expensive. In order to retain the necessary accuracy and speed to keep up with data from surveys, machine learning proves to be a valuable asset. Here, we utilize convolutional neural networks in conjunction with diffusion models and simulations from the CAMELS project to create mappings from relatively inexpensive dark matter simulations to galaxies from detailed but accurate hydrodynamic simulations. Our techniques outperform existing models, such as the Halo-Occupation Distribution method, both in speed and accuracy.

Presenter: SETHER, Tanner

Session Classification: Cosmology & Simulations