



Contribution ID: 565

Type: **Talk in a parallel session**

Illustris-TNG simulated central black mass and Galaxy properties correlations with a Machine Learning approach

Tuesday, 9 July 2024 17:00 (20 minutes)

Observationally, it is well established that the masses of central black holes are tightly correlated with galaxy properties, most notably the bulge's velocity dispersion. Cosmological hydrodynamical simulations can capture most of these correlations, but it is yet not understood why this occurs. To gain greater insight into central black hole growth we use machine learning algorithms to study the relationship between central black hole mass and other galaxy properties at $z=0$ in the TNG simulations. We find that the central black hole mass can be accurately predicted with just a few galaxy properties only if the central black hole mass is above a resolution dependent value. For those black holes we find a simple formula that predicts their mass within a mean absolute error of 1.14%, 0.95% and 0.68% for TNG 50, 100 and 300 respectively. We are also able to construct intuitive equations for both 100 and 300 boxes that estimates black hole mass well when used in the box it is trained on.

Primary author: DINDY, Imani (CUNY Graduate Center)

Presenter: DINDY, Imani (CUNY Graduate Center)

Session Classification: Black hole formation, evolution and the black hole mass gap

Track Classification: Black Holes: Classical and Beyond (BH): Black hole formation, evolution and the black hole mass gap