MACHINE LEARNING FOR ASTROPHYSICS
2ND EDITION CATANIA, 8-12 JULY, 2024

Contribution ID: **231** Type: **Oral Presentation**

Dynamical Modelling of Galactic Kinematics using Neural Networks

Thursday, 11 July 2024 10:00 (20 minutes)

The advent of integral field data has revolutionised the study of galaxy evolution. A key component of this is dynamical modelling methods which have allowed for crucial insights to be made from kinematic data. Despite this importance, most dynamical models make a number of key assumptions which do not hold for real galaxies. At the same time, machine learning methods are becoming increasingly powerful, with many applications appearing in astronomy. These have the potential to be used to both improve existing dynamical modelling methods as well as build new ones. To investigate this, we construct a training set of dynamical models of early-type galaxies using Jeans Anisotropic Modelling (JAM). We then train a neural network on this data using the parameters of JAM and mock photometry as the input. We find that we are able to speed up JAM to a remarkable degree while maintaining accuracy in our models. We conclude with some remarks on the application of this to cosmological hydrodynamical simulations and the prospects of producing the next generation of dynamical models.

Presenter: SIMON, David

Session Classification: Cosmology & Simulations