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Astroclass Project

Thursday 29 May 2025 12:45 (15 minutes)

The goal of the AstroClass project is to automate the extraction of some characteristic features of astrophysical structures through advanced machine learning techniques, with a focus on extracting density, pressure, and temperature profiles of galaxy clusters from multi-frequency observational data and brightness surface profiles. Leveraging Interpo.latory AutoEncoder neural networks, the project addresses the challenge of extracting meaningful 3D physical profiles from a limited dataset of X-ray and Planck observations.

This talk will present the project's methodological framework, including data prepa.ration, algorithm design. We will discuss the specific issues encountered due to dataset size and normalization, and the strategies adopted to mitigate overfitting and improve prediction accuracy.

The current validation phase, involving systematic hyperparameter tuning and per.formance evaluation, will be illustrated with preliminary results. Finally, we will outline the next steps towards deploying an open-access platform for the scientific community, designed to facilitate data sharing and collaborative research in the field of galaxy cluster analysis.

Presenter: MARTELLINI, Cristina (FUKO)

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