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CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND
APPLICATIONS

Gravitational Geometry and Dynamics Group Seminar

Wed. 31th May '23 Online at 15h00

Cosmology from galaxy phase-space information and a bit of halo-galaxy connection

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Zoom meeting ID 962 2413 8340

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In this talk, I will give an overview of how to do field-level likelihood-free inference with galaxy catalogs. More specifically, only using phase-space information, I will show how to convert galaxy catalogs into graphs. I will explain how to use graph neural networks, associated with moment neural networks, to constrain Omega matter. For the first time, we were able to obtain a model which is robust across 5 different hydrodynamic simulations (Astrid, IllustrisTNG, SIMBA, Magneticum, and SWIFT-EAGLE), i.e., 5 different sub-grid physics models while trained on a single one. Together I will explain how to do halo-galaxy connection with machine learning from 2 points of view: one-point value predictions and dealing with probability density distributions. The model performs really well in both cases, being the second perfect to recover scatter in the astrophysical relations.

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