Gravitational Physics
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I N V I T A T I O N

as part of the Gravitational Physics Literature Seminar

to the talk by

Marco BRUNI

(University of Portsmouth)

on

"Nonlinear Relativistic Structure Formation in ΛCDM"

Abstract:
In this talk I will give an overview of work on nonlinear structure formation in the the standard model of cosmology, ΛCDM, assuming General Relativity (GR). Starting from briefly presenting a post-Friedmann approximation (similar to post-Minkowski, but on a cosmological background and assuming small peculiar velocities), I will show how at leading order the gravito-magnetic effect (AKA frame-dragging) can be extracted from standard Newtonian N-body simulations, as well as from N-body simulations with GRAMSES, an approximate GR code. I will then present full-GR simulations of a toy-model "cosmic web" of over-densities, voids and filaments with the Einstein Toolkit fluid code, showing how the first shell-crossing at peaks of over-densities is very well predicted by the simple "top hat" model, while in the formation of the cosmic web a role is played by gravito-magnetism, especially around filaments.

In the last part of the talk I will illustrate some work in progress, some aimed at extending the work on frame-dragging on smaller galactic scales, some aimed at understanding to what extent relativistic effects can play a role during collapse and past the first shall crossing and virialization. I will conclude with an outline of possible future work.

Time: **Wednesday, 26 March 2025, 2:15 p.m.**
Location: **Seminarraum A, Währinger Straße 17, 1090 Vienna, 2nd floor**

https://univienna.zoom.us/j/6540036841?pwd=SytyVkZJZzNyRG9lMm13ejlHeHRRUT09

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