



universidade  
de aveiro



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

# Gravitational Geometry and Dynamics Group Seminar

Wed. 26<sup>th</sup> October '22 On Campus at 11h30

**Guilhereme Raposo**

University of Aveiro

Hybrid:

Sala Sousa Pinto, Math dept. and  
Zoom

## Elastic compact objects in General Relativity

In this seminar I will introduce a rigorous and general framework to study systematically self-gravitating elastic materials within general relativity. The formulation that will be presented in this seminar is particularly suitable to investigate the existence and viability, including radial stability, of spherically symmetric elastic stars. During the first part of this talk will provide the most simple elastic generalization to the well-known polytropic equation of state.

I will also discuss how elasticity affects the macroscopic structure of compact objects, in particular by increasing their maximum mass and compactness. In the second part of this talk I will focus on ultrarigid elastic objects. I will introduce the most general equation of state for these materials and I will use it to compute the maximum compactness of elastic stars. I will show how this analysis can be used to extend Buchdahl's bound on the compactness of self-gravitating bodies and also how it imposes new limits on the compactness of physically viable models. I will conclude the seminar by discussing how relativistic elasticity may be a key ingredient to build consistent models of exotic ultracompact objects and black-hole mimickers, and how it can also be relevant for a more accurate modelling of the interior of neutron stars.

[https://videoconf-  
colibri.zoom.us/j/96224138340?pwd=YkZUMGILb0dqVjcxOVpXM  
TFVMTBXQT09](https://videoconf-colibri.zoom.us/j/96224138340?pwd=YkZUMGILb0dqVjcxOVpXM TFVMTBXQT09)

*about us gravitation.web.ua.pt*

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