



## RTG Models of Gravity – Online Colloquium

<b>Date:</b>	01.07.2020
<b>Time:</b>	14:00 - 16:30
<b>Location:</b>	Online: Zoom-Conference (More information will be send via the Models of Gravity mailing list)

### Program

- 14:00 – 15:00 Talk 1: **Vanessa Graber**  
Institute of Space Sciences (ICE-CSIC), Barcelona, Spain  
*“Neutron Stars - Cosmic Superfluids”*
- 15:00 – 15:30 [Coffee Break](#)
- 15:30- 16:30 Talk 2: **Nicolás Sanchis Gual**  
Center for Astrophysics and Gravitation (CENTRA), Lisbon, Portugal  
*“Light in the dark: numerical relativity, compact objects,  
and gravitational waves”*

## Abstracts

### Talk 1: **Vanessa Graber**

Institute of Space Sciences (ICE-CSIC), Barcelona, Spain

*“Neutron Stars - Cosmic Superfluids”*

Neutron stars unite many extremes of physics which cannot be recreated on Earth, making them excellent cosmic laboratories for the study of dense matter. One exciting characteristic is the presence of superfluid and superconducting components in mature neutron stars - macroscopic quantum behaviour that is also prominent in terrestrial systems such as superfluid phases in ultra-cold atomic gases, heavy-ion collisions or superconducting transitions in metals. Although many theoretical models of superfluid and superconducting neutron stars have benefited from our understanding of laboratory condensates, several directions in connecting neutron star astrophysics and low-temperature physics remain little explored. In this talk, I will provide an overview of what we know about superfluid and superconducting neutron star components, and specifically focus on two aspects, pulsar spin-glitches and core superconductivity, where the link to laboratory quantum systems can help us better our understanding of neutron stars.

### Talk 2: **Nicolás Sanchis Gual**

Center for Astrophysics and Gravitation (CENTRA), Lisbon, Portugal

*“Light in the dark: numerical relativity, compact objects, and gravitational waves”*

The detections of gravitational waves are opening a new window to the Universe. The nature of black holes and neutron stars may now be unveiled, but gravitational radiation may also lead to exciting discoveries of new exotic compact objects, oblivious to electromagnetic waves. I will talk about three main topics involving fundamental scalar and vector bosonic fields coupled to gravity: (i) quasistationary configurations of scalar fields around Schwarzschild black holes as scalar field dark matter models, (ii) the superradiant instability, the spontaneous scalarization, and the formation of charged hairy black holes, and (iii) bosonic stars. These systems could have important astrophysical relevance, if ultralight bosonic fields exist in Nature.