

**Journée des groupes de travail
"Cosmologie" et "Tests de la
relativité générale et théories
alternatives" du GdR Ondes
Gravitationnelles**

**Rapport sur les
contributions**

ID de Contribution: 1

Type: **Non spécifié**

Talk 1 - Sébastien Renaux-Petel (IAP)

vendredi 13 octobre 2023 11:30 (45 minutes)

Classification de Session: Déjeuner

ID de Contribution: 2

Type: **Non spécifié**

Talk 2 - Nicola Franchini (APC)

vendredi 13 octobre 2023 10:45 (45 minutes)

ID de Contribution: 3

Type: **Non spécifié**

Talk 4 - Danny Laghi

vendredi 13 octobre 2023 14:15 (45 minutes)

Titre : “Gravitational wave cosmology with standard sirens: a review of cosmological constraints from LVK observations and future prospects with LISA”

“Gravitational waves emitted by the compact binary coalescence of binary black holes, neutron star-black holes, and neutron stars, are examples of standard sirens, capable of completely bypassing the cosmic distance scale ladder that hinders local electromagnetic measurements. With additional information on their redshifts, they can be used to constrain cosmological parameters. This talk will review the cosmological constraints obtained from the most recent gravitational wave observations, with a focus on the latest results produced by the LIGO-Virgo-KAGRA Collaboration, also discussing cosmological forecasts with the standard sirens observed by the future space-born gravitational wave detector LISA.”

ID de Contribution: 4

Type: **Non spécifié**

Talk 5 - Eve Dones

vendredi 13 octobre 2023 10:00 (45 minutes)

Tidal effects up to the next-to-next-to leading post-Newtonian order in massless scalar-tensor theories of gravity

“The arrival of third-generation gravitational wave detectors in 2030-2035, such as the Einstein Telescope and the space-based LISA detector, promises major advances in our understanding of the theory of gravity and of compact objects. However, the very high precision of the expected data presents us with new challenges, including distinguishing, when analyzing gravitational wave data, between effects due to a change in the theory of gravity and those coming from the matter of neutron stars. Therefore, it is necessary to develop very accurate waveforms for the analysis that consider both effects at the same time. In this talk, I will introduce how the post-Newtonian framework, initially developed to describe the inspiral of compact binaries in GR, has been adapted for massless scalar-tensor theories of gravity. I will show how to incorporate tidal effects in our models and discuss how likely we will be observing these effects in the future.”

ID de Contribution: 5

Type: **Non spécifié**

Talk 3 - David Trestini (IAP)

vendredi 13 octobre 2023 13:30 (45 minutes)

Gravitational waves in scalar-tensor theory at 1.5PN order beyond Einstein's quadrupole formula.

With future gravitational wave (GW) detectors such as the Einstein Telescope and LISA, we expect to detect many more GW signals coming from neutron star binaries, and with increased accuracy. In this talk, I will present recent results around gravitational waveforms in massless scalar-tensor (ST) theories of gravity. Due to no-hair theorems that hold in these theories, it is expected that the GW emission of binary black holes does not deviate from GR. However, in neutron star-black hole and binary neutron star systems, dipolar radiation can appear, and non-linearities appear at lower orders. In this work, using multipolar post-Minkowskian (M-PM) and post-Newtonian (PN) formalisms, we computed ready-to-use templates for gravitational and scalar waves generated by compact binary systems in ST theories to 1.5PN beyond the GR quadrupole radiation. We computed observables such as the flux, the phase and the spherical harmonic modes, and compared our result to existing literature.