

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Laboratoire des 2 infinis - Toulouse

CNRS identification code: UMR5033

Internship director's surname: Tamanini

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Internship location: Toulouse

Thesis possibility after internship: NO

Funding: YES

If YES, which type of funding: Gratification de stage

COSMOLOGY AND GRAVITATIONAL WAVES: NEW TESTS OF THE STANDARD COSMOLOGICAL MODEL

Gravitational waves constitute a new observational instruments which convey new information about our Universe and its structures in a completely complementary way with respect to standard electromagnetic observations. In particular gravitational waves emitted by the mergers of black hole and neutron star binaries can be used to test how fast the universe expands at different epochs of its evolution. Consequently different cosmological models can be tested with gravitational waves, with new possible insights into the contemporary mysteries of the Universe such as dark energy, dark matter, the Hubble tension, and others. This internship project aims at investigating standard and alternative scenarios describing the evolution of our Universe using gravitational-wave observations from current and next generation gravitational-wave observatories. The student will become familiar with the basics of the theory of gravitational waves and with Bayesian statistical inference, she/he will get acquainted with some of the advanced theoretical and computational state-of-the-art techniques used in gravitational-wave cosmology. She/he will also have the opportunity to work within the framework of large international collaborations dedicated to observe gravitational waves, in particular the LIGO-Virgo-KAGRA Collaboration, the LISA Consortium and the Einstein Telescope Consortium. The internship will be undertaken in the GW group at the L2IT in Toulouse, which is composed by internationally well-known researchers, and currently counts 3 postdocs, 4 PhD students and 3 software engineers. Weekly interactions with group members and other L2IT members will expose the student to a highly dynamical environment where the she/he will be able to affine her/his research skills.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: NO Soft Matter and Biological Physics: NO

Quantum Physics: NO Theoretical Physics: YES