

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Laboratoire des 2 infinis - Toulouse

CNRS identification code: UMR5033

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Internship location: Toulouse

Thesis possibility after internship: NO

Funding: YES

If YES, which type of funding: Gratification de stage

MASSIVE BLACK HOLES IN REALISTIC LISA DATA: MODIFIED GRAVITY OR INSTRUMENTAL ARTIFACTS ?

LISA is a future space-based detector that will fly in the mid-2030s and detect gravitational waves at low frequencies, targeting massive black hole binaries with masses of millions of solar masses. These signals will be extremely loud compared to the detections of stellar-mass black holes by LIGO/Virgo, and LISA will bring us in an era of high-precision gravitational-wave astronomy, enabling tests of general relativity (GR) with an unprecedented precision. However, most simulations of LISA data analysis work with an idealized instrument. In reality, the data will be complex, with non-stationarities and glitches, and with superposed signals. Hence the question we will address in this internship: could we mistake superposed signals or instrumental artefacts with deviations from GR ? Can we design workarounds in our analysis, to unleash LISA's full potential ? 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