

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Laboratoire des 2 infinis - Toulouse (L2IT)

CNRS identification code: UMR5033

Internship director's surname: Marsat et Piarulli

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Internship location: L2IT, 75 course des sciences, 31062 Toulouse

Thesis possibility after internship: NO

Funding: YES

If YES, which type of funding: gratification de stage

Title: A GUEST for LISA: exploring synergies between interferometric and satellite tracking space missions for gravitational waves

Summary (half a page maximum)

The Gravitational Universe Exploration with Satellite Tracking (GUEST) is a proposed space mission aimed at detecting gravitational waves (GWs) around 0.1 mHz. GUEST will consist of two spherical, high-density satellites covered by laser reflectors, laser-tracked by ground stations to accurately reconstruct the orbits. Among the GW sources that GUEST aim at detecting are massive black hole binaries (MBHBs) at few years from their merger, when the Laser Interferometer Space Antenna (LISA) space mission will observe their GW signal with high accuracy.

This internship project will investigate synergies between GUEST's and LISA's observations of MBHBs. The intern will use numerical codes to analyse simulated GUEST and LISA data in order to assess the joint detectability of MBHBs and characterise their parameters. A particular emphasis will be given to possible improvements on the sky-localisation of MBHBs to boost multi-messenger opportunities.

The intern will acquire first hand experience with data analysis codes in the context of GW space missions, expertise on advanced statistical methods applied to fundamental physics, and deep knowledge of GW science and its and multi-messenger implications.

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

Condensed Matter Physics: YES/NO Soft Matter and Biological Physics: YES/NO
Quantum Physics: YES/NO Theoretical Physics: YES/NO