

# Extreme mass-ratio inspirals as fundamental physics probes

*Wednesday, 18 September 2024 10:10 (20 minutes)*

The LISA satellite, recently adopted by ESA, is ready to open a new gravitational wave window, targeting sources dim to ground based detectors like LIGO and Virgo.

Extreme mass-ratio inspirals (EMRIs), composed by a massive black hole and a stellar mass secondary, are among the most peculiar of such new family of binaries. The inspiral phase of these systems falls within the mHz regime of the LISA band. Depending on their mass ratios EMRIs will be continuously observed over long periods, ranging from months to years. Such long evolution is key to provide a measurement of the source parameters with exceptional accuracy, and to allow to perform precise tests of gravity.

In this talk I will discuss how, from a theoretical perspective, we can model the dynamics of these systems beyond vacuum General Relativity, and how to construct gravitational wave templates that can be used for LISA searches. I will also show how EMRI observations, supplied by such waveforms can be used to probe the existence of new fundamental fields and particles.

**Primary author:** GLIORIO, Sara (Gran Sasso Science Institute)

**Presenter:** GLIORIO, Sara (Gran Sasso Science Institute)

**Session Classification:** Contributed Talks