

Overview of the LISA detector and its future observational capabilities

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In this talk, we will provide an overview of the Laser Interferometer Space Antenna (LISA) and its future observational capabilities. LISA, recently adopted by the European Space Agency (ESA) and scheduled to launch in 2035, will consist of a constellation of three spacecraft arranged in an almost equilateral triangle, with millions of kilometers separating each pair. This very long baseline will allow LISA to detect gravitational waves (GW) in the mHz range. This frequency band is expected to be extremely rich in GW sources but completely in-accessible to current ground-based detectors. Therefore, LISA is expected to provide advancements across a wide range of subjects, from cosmology and astrophysics to fundamental physics.

Since LISA is the first mission of its kind, achieving the required sensitivity for this significant scientific return involves overcoming a number of technical challenges. We will review key aspects of LISA's instrument design and operational principles, including the overall mission architecture, the laser interferometry technique at its core, the main limiting noise sources, and the complex data processing pipeline needed to extract meaningful signals from the raw measurements.

Primary author: Dr HARTWIG, Olaf

Presenter: Dr HARTWIG, Olaf

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