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LISA: a spaceborn observatory for gravitational waves (PNGRAM)

LISA is the first space-borne instrument dedicated to the observation and study of gravitational waves, elusive offsprings of Einstein's theory of General Relativity. With the adoption of LISA in last January, ESA acknowledged the maturity of the mission concept and gave its go-ahead to build the instruments and the spacecraft. LISA is a constellation of 3 satellites, each one hosting 2 free-falling test masses and forming an equilateral triangle with 2.5 Mkm armlength trailing the Earth on its orbit around the Sun. LISA shall be launched in 2035 on Ariane 6.

With a metrology sensitivity of a few pm over timescales of seconds to hours, LISA will capture the ripples of space-time produced by compact objects like super massive black holes, binary neutron stars, extreme mass ratio inspirals, etc.

The performance of LISA relies of challenging technologies, from ultra-stable long distance metrology to drag-free flying, which have been tested, for most of them, with LISA Pathfinder.

This presentation will give an overview of the LISA mission, its main scientific objectives, technical challenges and present status. The French contributions to the mission, including the tests of the instrument on ground and the development of the data processing infrastructures will also be described.