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Scientific challenges with LISA

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The excellent results of the LISAPathfinder mission gave the green light for LISA mission. ESA approved the LISA mission as the large mission on the theme “The Gravitational Universe”. This future observatory will observe gravitational wave from space between 0.02mHz and 1Hz, opening a new window on the Universe complementary to LIGO/Virgo and Pulsar Timing Array. The expected sources are SuperMassive Black Hole Binaries until very high redshift, tens of thousands of Galactic Binaries, Extreme Mass Ratio Inspiral, Stellar Mass Black Hole Binaries, stochastic backgrounds from the very early Universe plus all the unexpected sources.

In this talk, I will present LISA mission and its expected performances. I will review the scientific goals of LISA in astrophysics, physics and cosmology. I will show in particular the main scientific challenges of this mission.

Primary author: Dr PETITEAU, Antoine (APC - Université Paris-Diderot)

Presenter: Dr PETITEAU, Antoine (APC - Université Paris-Diderot)

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