ID de Contribution: **72** Type: **MÉTHODES D'ANALYSE DES DONNÉES**

Sparse Data Inpainting for LISA gapped data

mardi 30 mars 2021 14:45 (15 minutes)

With LISA mission, the detection of galactic binaries as sources of gravitational waves promises an unprecedented wealth of information about these systems, but also raises several challenges in signal processing. In particular, the variety of sources and the presence of both planned and unplanned gaps call for the development of robust methods. We describe here an original non-parametric joint reconstruction (data inpainting) of both the imprint of galactic binaries and adequate instrumental noise in the data gaps. We carefully show that a sparse data representation gives a reliable access to the physical content of the interferometric measurement, even when the data is gapped, and that the recovered noise distribution matches with the expected noise distribution for LISA.
We demonstrate the successful data recovery on a simple yet realistic example involving verification galactic binaries recently proposed in LISA data challenges. We also propose a first assessment of the impact of gaps on LISA data.

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Classification de Session: Contributed talks: Data analysis methods