Contribution ID: **20** Type: **not specified**

The Gaia legacy: Gravitation and multi-messenger astronomy with Gaia NIR

Thursday, 18 January 2024 12:00 (20 minutes)

The very core of the Gaia data analysis and processing involves General Relativity (GR) to guarantee its scientific products as, at Gaia's precision, Solar System perturbations on stellar light rays cannot be neglected.

Besides, GR models offer the unique possibility of establishing a multi-laboratory for extensively testing gravity theories and gravitational waves (GWs) from Solar System to Milky Way and cosmological scales. As a matter of fact, the large amount of information accumulated over 10+ years by Gaia will be further extended thanks to Gaia NIR to catch possible GW signatures and/or lensing effects on astrometric/photometric raw epoch data and, thus, to further boost synergies with other GW detectors and assist efforts in characterizing GW signal strength and direction, and the astrophysical nature of GW sources.

The Gaia-NIR observations targeting the Galactic bulge and its center will have a huge impact in probing the structure of our whole Galaxy as the product of cosmological evolution shaped by gravity (Local Cosmology), i.e. the relations among baryonic structures (and their evolution) and the dark components of the Universe.

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