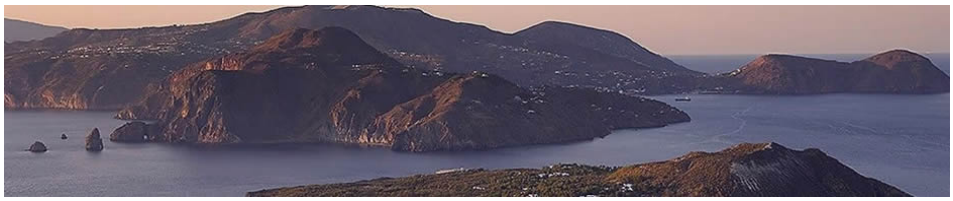

Contribution ID: **32** Type: **not specified**

Testing gravity with Gaia

As of April 25th the second release of the Gaia catalogue (DR2) becomes available to the scientific community worldwide. It contains the five-parameter astrometric solution (positions on the sky, parallaxes, and proper motions) for more than 1.3 billion sources, with a limiting magnitude of G = 21 and a bright limit of G ≈ 3, and median radial velocities for more than 7.2 million stars. The uncertainties of the DR2 astrometry is still too low to detect clearly relativistic effects associated to the received null geodesic from within the multi-gravitational fields of the Solar System. However, a method of differential astrometry applied to the data appears capable of spotting the complex light deflection by Jupiter; and this technique could be extended to consider passing gravitational waves which affect photon propagation.

Moreover, the independent astrometric solution underway at the Italian data processing center in Turin (DPCT), for verification purposes, is based on a precise general relativistic treatment of the data that implements, in a sophisticated computing infrastructure, theoretical models for the observables and the observer.

This implies that the Gaia catalogue delivers a relativistic kinematic as far as the five-parameter astrometric solution is concerned demanding, for the sake of consistency, a relativistic dynamics for the Galaxy whose structure, formation, and evolution is Gaia's main goal.

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