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## The SaToR-G experiment: testing metric and non-metric theories of gravity in the Earth's field via laser tracking to geodetic satellites

*Thursday, 8 July 2021 16:50 (20 minutes)*

Satellite Tests of Relativistic Gravity (SaToR-G) is a new experiment in fundamental physics of the National Scientific Committee 2 (CSN2) of the Italian National Institute for Nuclear Physics (INFN).

The experiment aims at testing gravitation beyond the predictions of Einstein's Theory of General Relativity in its weak-field and slow-motion limit, searching for effects foreseen by alternative theories of gravitation and possibly connected with "new physics". The predictions of General Relativity on the orbits of geodetic satellites, which play the role of test masses, will be compared with those of alternative theories of gravity both metric and non-metric in their essence. This will allow to test, in addition to other aspects of gravitation, the field equation of gravity. The natural theoretical framework to test gravitation will be that of the Parameterized Post-Newtonian (PPN) formalism. However, we will also try to apply, as far as possible, the approach suggested by R. H. Dicke more than 50 years ago, usually referred to as the Dicke framework. This is a fairly general framework that allows us to conceive experiments not connected, a priori, with a given physical theory and also provides a way to analyze the results of an experiment under primary hypotheses.

The activities of the experiment related to the development of perturbative models to better determine the dynamics of the orbits of the considered satellites will be presented together with preliminary results on possible new constraints to alternative theories of gravitation.

**Primary author:** LUCCHESI, David (INAF/IAPS Tor Vergata and INFN ROMA2)

**Co-authors:** Dr ANSELMO, Luciano (Istituto di Scienza e Tecnologie dell'Informazione (ISTI/CNR)); Prof. BAS-SAN, Massimo (Dipartimento di Fisica, Tor Vergata; INFN Roma2); Dr LUCENTE, marco (Istituto di Astrofisica e Planetologia Spaziali (IAPS/INAF)); Dr MAGNAFICO, Carmelo (Istituto di Astrofisica e Planetologia Spaziali (IAPS/INAF)); Dr PARDINI, Carmen (Istituto di Scienza e Tecnologie dell'Informazione (ISTI/CNR)); Dr PERON, Roberto (Istituto di Astrofisica e Planetologia Spaziali (IAPS/INAF)); Prof. PUCACCO, Giuseppe; Dr SAPIO, Felicia (Istituto di Astrofisica e Planetologia Spaziali (IAPS/INAF)); Dr VISCO, Massimo

**Presenters:** LUCCHESI, David (INAF/IAPS Tor Vergata and INFN ROMA2); Dr VISCO, Massimo

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