Contribution ID: **2** Type: **talk**

Geodesy and non-newtonian gravity

Wednesday, 7 July 2021 14:20 (10 minutes)

In the past decades, Earth's geoid has been successfully measured by the GOCE and GRACE missions. The usual data analysis consists in making a spherical harmonic expansion of the measured gravity field, which nonetheless restricts to the case of Newtonian gravity in published works.
In this talk, I will present the impact of considering a finite coupling scale Yukawa deviation to a Newtonian potential.
In particular, I will show that for this model, we can still derive harmonic coefficients, which now depend on the distance to the source of gravity. This implies a new degeneracy between Yukawa parameters and the extracted geoid models that depends on the altitude at which geodesy experiments are performed. I will then discuss how one could, in principle, detect a Yukawa deviation by comparing the extracted geoid models at different altitudes.

arXiv:1808.00340
DOI: 10.1088/1361-6382/aae9a1

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Session Classification: Recorder Talks: Geodesy and Ranging