

# **Solar system tests of Einsteinian and post-Einsteinian gravity**

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The present-day level of accuracy in planetary orbital motion reconstruction allows to realistically consider the possibility of performing various tests of Einsteinian and post-Einsteinian gravity. The inner planets of the Solar System are the best candidates to measure the general relativistic gravitomagnetic field of the Sun via the Lense-Thirring effect. Its predicted secular rates on planetary perihelia, ranging from  $-0.002$  (Mercury) to  $-0.0001$  (Earth) arcseconds per century, are compatible with the latest processed data. Although the errors are still large and do not exclude the possibility of a zero-effect, the hypothesis of the existence of the Lense-Thirring signature as predicted by general relativity fits better the data. Already launched or planned missions like VenusExpress, Messenger and BepiColombo should greatly enforce the precision and the reliability of such preliminary test by improving our knowledge of the orbits of the inner planets. The outer planets of the Solar System are the best candidates to test some post-Einsteinian modified gravity models which predict effects of the order of  $0.001$ - $0.0005$  arcseconds per century. At present such values lie just at the edge or below the available accuracy; interplanetary missions to the giant planets, or their moons, endowed with accurate tracking devices would be needed to provide the required improvements in their orbital determination.