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Determination of Jupiter's gravity field by Juno

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The Juno spacecraft is currently orbiting Jupiter in a highly eccentric, 53.5-day orbit, with a perijove altitude of about 4000 km. It collects crucial data for the determination of Jupiter's interior and its magnetic environment. Up until the end of 2017, Juno dedicated four perijove passes to the determination of Jupiter's gravity field, out of a total of ten perijove passes.
The first two passes have shed light on the interior by suggesting the presence of a diluted core. The analysis of the first two gravity-dedicated perijove passes (PJ03 and PJ06) revealed the North-South asymmetry in Jupiter's gravity field, which have been explained by the surface wind dynamics.
The accurate gravity field determination is possible thanks to Juno's radio system, capable of establishing two-way radio links with the ground antenna, that collects Doppler data from two coherent links at Ka and X bands (32.5 and 8.4 GHz). This tracking configuration enables a calibration of dispersive noise, mainly induced by the Io plasma torus.
A multi-arc analysis of the four perijove passes dedicated to gravity science (PJ03, PJ06, PJ08, and PJ10) shows consistent results with previous estimates of Jupiter's gravitational field, with better estimation accuracy. The dataset allows us to set an upper limit on Jupiter's low-degree tesseral component of the gravity field, which may arise from surface winds' local features (e.g., the Great Red Spot). The retrieval of Jupiter's pole position and motion is also presented and discussed.