



Fundamental Physics on the Moon

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Abstract

We introduce the Jacobi coordinates adopted to the advanced theoretical analysis of the relativistic celestial mechanics of the Earth-Moon system. Theoretical derivation utilizes the relativistic resolutions on the local reference frames adopted by the International Astronomical Union in 2000. The advantage of the local frames is in a more simple mathematical description of the metric tensor and equations of motion. The set of one global and three local frames is introduced in order to decouple physical effects of gravity from the gauge-dependent effects in the equations of relative motion of the Moon with respect to Earth. We pay particular attention to a unique opportunity to detect the gravitomagnetic tidal field in the orbital motion of the Moon with the advanced LLR technology.