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A refined LLR model for the determination of relativistic parameters, secular tidal acceleration and UT0

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Lunar Laser Ranging (LLR) is carried out for more than 40 years. The data set is analysed in a weighted least-squares adjustment to determine several parameters of the Earth-Moon-system, e.g. the moon's tidal acceleration, lunar orbit and earth orientation parameters. Furthermore, LLR allows for testing relativity, e.g. the strong equivalence principle or the time variability of the gravitational constant.

A further step on the way to mm-accurate LLR analysis is the refined modelling of the moon's interior which mainly affects the moon's rotation. The previous modelling of the moon as a homogeneous, elastic and dissipative body has been extended by the contribution of a possible fluid core.

Based on the refined modelling and using LLR data from 1970 to 2009 the following studies are conducted:
- test of relativistic properties, like strong equivalence principle, non-linearity or relativistic precession,
- frequency dependent modelling of secular tidal acceleration,
- determination of UT0 and comparison with IERS C04 series.

Corresponding results are presented and discussed.