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# Interpretation of unexplained abnormal secular change of the semimajor axis and the eccentricity of the lunar orbit in the modern era

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*Unexplained secular effects in the orbital movement of the Moon are consequences of the discovered in recent years phenomenon of remove of the center of mass of the Moon relative its mantle and crust towards the dark side. Abnormal secular variations of the semimajor axis and the eccentricity of the lunar orbit discussed in modern scientific literature are interpreted as fictitious phenomena. They are conditioned by secular drift of the centre of mass of the Moon relative to its crust and mantle in the direction from the Earth that is towards the dark side of the Moon. An approximate estimate of the drift velocity may be about 5...8 mm/year. The phenomenon and the secular anomalous change of the lunar orbital eccentricity are displayed by precision data of laser observations of the Moon only, but not dynamic features of the movement of the centre of mass of the Moon in space. The abnormal secular change of the orbital eccentricity of the Moon is concerned with the spatial nature of the displacement of the centre of mass of the Moon regarding the system of reflectors on its surface. This is also true for secular and abrupt changes of the orbital elements of the Moon in the laser observation data.*

**Keywords:** shells of planets, light location observations, space geodesy, mantle of the Earth, the core of the Earth.

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