

Sub-Millimeter Lunar Laser Ranging: Novel Approach to Moon Reference Frame

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Since 1969, lunar laser ranging (LLR) is an effective tool for high-precision measurement of the distance between the Earth and the Moon. First LLR of the retro-reflectors on the Lunar surface were carried out with an accuracy of several tens of centimeters, currently LLR has reached centimeter accuracy. A wide class of the Moon exploration tasks, including the development of the Moon Reference Frame (MRF), require a new level of the Earth-Moon distance accuracy, millimeter and even better. The further increase of the accuracy connects with the delivery and installation of new single large-size retro-reflectors on the lunar surface, and with the creation of a new generation of LLR stations capable of measuring the Earth - Moon distance with sub-millimeter accuracy.

The project of creation of the new generation LLR station at the Caucasus Mountain Observatory of the Lomonosov Moscow State University, as well as issues of improving the accuracy of MRF, are discussed in this report.

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