Laser measurements of the Moon: achievements, problems and prospects

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Laser measurements have gone through several stages in their development and have provided significant progress in the study of the Moon itself, as well as in the "Earth-Moon" system. The article discusses the main aspects of the use of laser measurements in solving three major problems: ground-based lunar laser ranging, laser orbital altimetry, as well as the study of lunar mascons. Despite the impressive successes achieved with the help of lasers, there are still unresolved issues. The authors of the article present their own experience with laser altimetry data. This experience concerns, first of all, the study of young impact structures on the Moon. In particular, measurements of the Tsiolkovsky and Aitken craters, as well as the Orientale and South Pole-Aitken impact basins, are considered. The report formulates the task of comparing measurements of the topography of lunar relief elements performed by laser altimetry from lunar orbit with classical relief measurements by an independent photogrammetry method.