

Evaluation of a lunar surface as a place for observations of lunar physical librations

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ILOM (In-situ Lunar Orientation measurements) project was proposed for the purpose of 1) making clear whether a liquid core is present or not from observations of lunar free librations, 2) investigating elastic property of lunar mantle from observations of the librations and lunar tides, and 3) unveiling origin and evolution of the Moon. Importance of this proposal has been enhanced since Williams et al. showed the evidence of the lunar liquid core by re-analysing LLR data.

Feasibility study and development of technology are made in order to put a PZT telescope with a focal length of 2m and an aperture of 20cm on the lunar surface which can measure the lunar orientation with 1-milli-arc-second star positioning accuracy. It has a beam splitter which enables observations of both the polar and the equatorial stars in order to measure a spin rate of the Moon, too.

We evaluate the lunar surface as a place for the precise positioning by using a telescope. The lunar surface has the advantages of no flicker noise, low seismic noise, availability of a stable base. It has, on the other hand, also disadvantages such as a dust from a surface regolith, severe thermal condition. As a result of roughly quantitative evaluation of the lunar surface, it has a potential to realize a new type of observation which is not possible on the Earth or onboard a satellite.