Image: MoonLIGHT retroreflector bound for the moon

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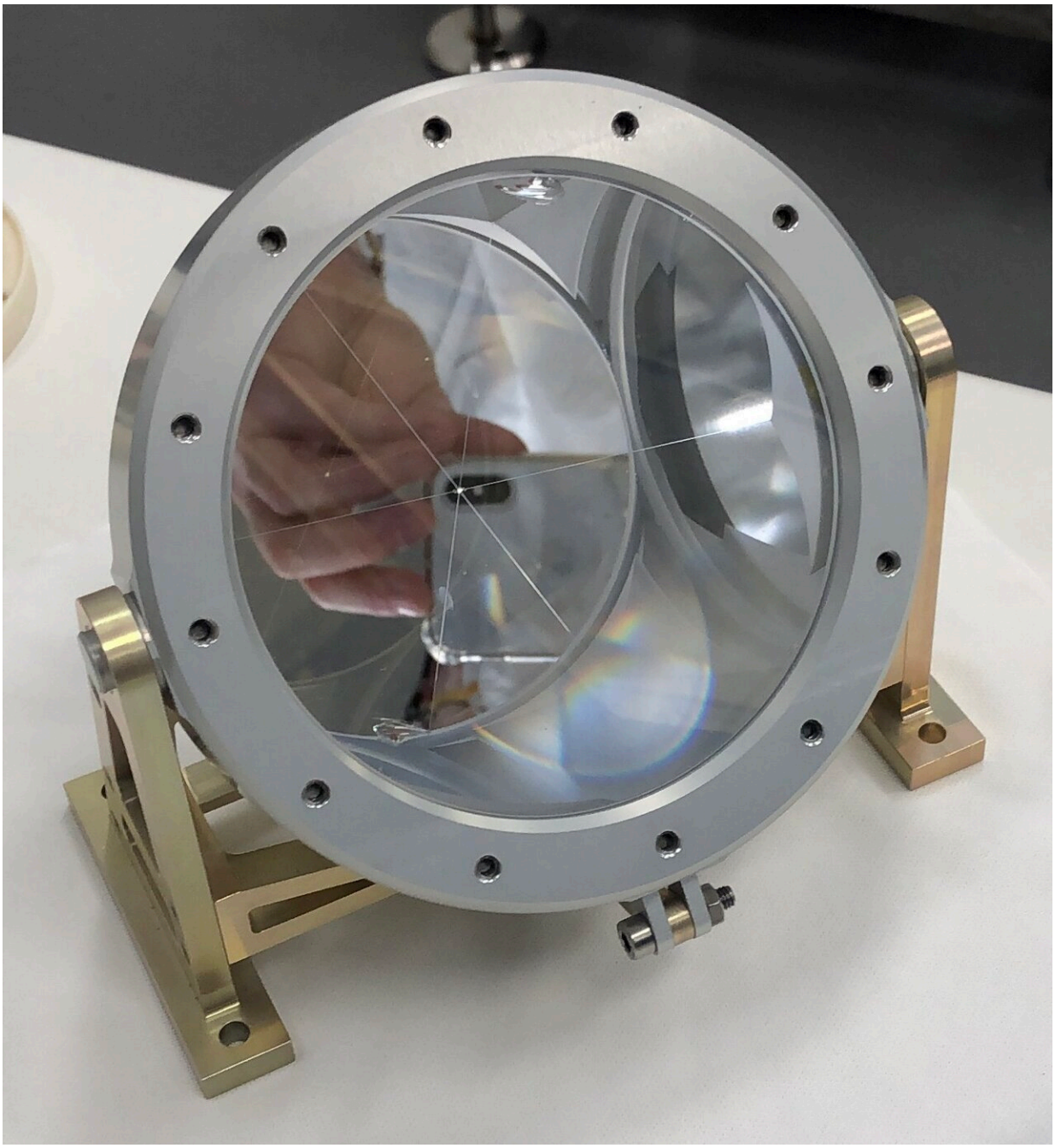

Credit: INFN (Istituto Nazionale di Fisica Nucleare), Frascati (Rome), Italy

Mirror, mirror on the moon, how far away are you?

MoonLIGHT, or Moon Laser Instrumentation for General relativity/geophysics High-accuracy Tests, is seeking the answer to this and more questions on general relativity, the gravitational dynamics of the Earth-Moon system and the deep lunar interior.

MoonLIGHT is a laser retroreflector, imaged here, which allows laser beams sent from Earth to be reflected back from the moon to receivers on our planet. This allows very precise measurement of the distances between the reflector and the ground station.

Known as lunar laser ranging, this technique has been in use since the Apollo missions to investigate Einstein's theory of general relativity, lunar geophysics and the Earth-Moon dynamics, among other fields of study. However, data from retroreflectors of the Apollo era is not as precise due to lunar vibrations, or the perceived lagging and wanning of the moon when viewed from Earth, caused by its eccentric and tilted orbit of our planet.

The MoonLIGHT retroreflector can reduce this error thanks to its next-generation compact design. The single, larger reflector with a front face 100mm in diameter can improve accuracy to within millimeters.

Developed by the Italian National Institute of Nuclear Physics and managed by ESA, MoonLIGHT will launch in 2024 on NASA's Commercial Lunar Payload Services initiative to the Reiner Gamma region of the moon, which has one of the most distinctive and enigmatic natural features on the moon, called lunar swirl, characterized by high surface luminosity (albedo) and the very rare presence of a local magnetic field.

Provided by European Space Agency