

Hollow Retroreflectors for Lunar Laser Ranging at Goddard Space Flight Center

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Laser ranging to the retroreflector arrays placed on the lunar surface by the Apollo astronauts and the Soviet Luna missions have dramatically increased our understanding of gravitational physics along with Earth and Moon geophysics, geodesy, and dynamics. Although the precision of the range measurements has historically been limited by the ground station capabilities, advances in the APOLLO instrument at the Apache Point facility in New Mexico is beginning to be limited by errors associated with the lunar arrays. At Goddard Space Flight Center, we have developed a facility where we can design, build, and test next-generation hollow retroreflectors for Lunar Laser Ranging. Here we will describe this facility as well as report on the bonding techniques used to assemble the retroreflectors. Results from investigations into different high reflectivity mirror coatings, as well as dust mitigation coatings will also be presented.