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Benefit of the next generation corner cubes for Lunar Laser Ranging analysis

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More than 44 years of Lunar Laser Ranging (LLR) data analysis is based on observations using mainly 4 observatories and 5 retro-reflectors on the Moon. A single lunar retro-reflector array consists of a panel of small Cube Corner Reflectors (CCRs), which reflect the incoming laser signal back to the observatory on Earth. The effect of the lunar librations on the panel of retro-reflectors causes a temporal spreading of the return signal, limiting the accuracy of the measurement for a single photoelectron return. A new generation of retro-reflectors has only one large CCR, which allows a more precise determination of the returning signal on Earth.

We will show the simulated effect of the next generation lunar retro-reflectors, deployed at selected locations on the Moon. In these simulations, we assume a measurement precision at the mm-level. The benefit of the new reflectors will be demonstrated addressing the accuracy of different estimated parameters concerning geometric aspects, like coordinates of retro-reflectors, as well as aspects related to relativity, like tests of the equivalence principle.