Abstract Submitted
for the CUWIP21 Meeting of
The American Physical Society

Bell Tests In the Moon-Earth Scale INCI ANALI, Harvey Mudd College, NGAN NGUYEN, Pitzer College, JASON GALLICCHIO, Harvey Mudd College, NASA JPL DEEP SPACE QUANTUM LINK TEAM — Entanglement is measured in a so-called Bell Test, which puts a bound on the correlation between the states of two particles under a local-realist theory (hence Bells Inequality). We propose a Bell Test with a source halfway between the Earth and the Moon that would send a pair of entangled photons to a polarizer on the Moon and a polarizer on the Earth, the settings of which humans would adjust. At this large scale, humans would be space-like separated, meaning the decision on one side could not affect the photons measurement outcome on the other side. Moreover, humans could be given sufficient time to be presented with a choice, make a decision, and turn that decision into a polarizer setting after the pair of entangled photons were sent. We expect this experiment to violate Bells Inequality, but if it didnt, it would mean entanglement could be explained through a hidden-variable theory. In any case, taking Bell Tests to this large scale might better validate non-locality and perhaps, combined with the effects of relativity, show us something new.

Inci Anali
Harvey Mudd College

Date submitted: 20 Dec 2020 Electronic form version 1.4