Intensity fluctuations in the Compensated Earth Moon Earth Laser Link (CEMERLL) experiment

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The Compensated Earth Moon Earth (CEMERLL) experiment is designed to demonstrate the benefit of adaptive optics in transmitting laser pulses to an array of retroreflectors on the surface of the moon, and measuring its return at receiving station nearby the transmitter. Turbulence compensated laser light using a Rayleigh guide star beacon propagates to the retroreflectors and back through the atmosphere to the receiver, In order to derive the probability density function of the detected intensity, we need to consider these 3 sources of scattering; the residual phase errors from the uplink compensation, the interaction with the retroreflector array, and the uncompensated turbulence on the downlink. Comparisons will be made between the developed theory and with data taken during the experiment to determine the validity of the model.

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