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First measurements with the Physikalisches Institut Radiometric Experiment (PHIRE)

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Performing accurate photometry of solar system objects requires an understanding of the bidirectional reflectance distribution functions (BRDFs) of the surfaces being studied. A BRDF characterizes the distribution of scattered light from a surface as a function of illumination angle, emission angle, and the physical properties of the surface itself. Unfortunately, the location of the sun and viewing platform at the time observations are made tends to dictate the viewing geometry, regardless of whether the platform is a spacecraft or ground based telescope. As a result, models must be used to extrapolate the available data to alternative geometries. Because the validity of those extrapolations is questionable, we have used the Physikalisches Institut Radiometric Experiment (PHIRE) to measure the BRDF of JSC-1 lunar soil simulant and compare results to the predictions of published BRDF models that have been fitted to observations of the Moon and Mercury.