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Precision Photometry via Man-made Light Sources, for Optical and for Microwave Astronomy

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Understanding the properties of dark energy via SNIa will require unprecedented photometric precision. Laboratory and solar photometry and radiometry regularly achieve precisions on the order of parts in ten thousand, but photometric calibration for non-solar astronomy presently remains stuck at the percent or greater level. We discuss our project to erase this discrepancy, and our steps toward achieving laboratory-level photometric precision for surveys late this decade. In particular, I will show observations of the balloon-borne light source we are presently testing, in
addition to previous work with a present calibrated source in low-Earth orbit. Our technique is additionally applicable to microwave astronomy. Observation of gravitational waves in the polarized CMB will similarly require unprecedented polarimetric and radiometric precision, and I will briefly discuss our plans for a calibrated microwave source payload as well.

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