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Inflight alignment and calibration of SR-POEM ROBERT REASENBERG, JAMES PHILLIPS, Harvard-Smithsonian CFA — We are developing SR-POEM, a payload for detecting a possible violation of the weak equivalence principle (WEP) while on the free-fall trajectory of a sounding-rocket payload. We estimate an uncertainty of $\sigma(\eta) \leq 10^{-17}$ from a single flight. The experiment consists of calibration maneuvers plus eight 120 s drops of the two test masses (TMs). The instrument orientation will be reversed between successive drops, which reverses the signal but leaves most systematic errors unchanged. The TMs are unconstrained during drops. They are surrounded by capacitance plates that allow both measurement and control of TM position and orientation with respect to the physics package. The calibration maneuvers are carried out both before and after the series of drops. The pre-drop calibration maneuvers define the "centering" of the TMs, nominally at the payload center of mass. Each of the eight drops then starts with nonmoving TMs precisely at this location. The post-drop calibration maneuvers detect changes in the location of the payload center of mass and serve to bound the corresponding contribution to systematic error.

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