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SR-POEM requirements for spurious acceleration reduction¹ BIJU PATLA, SAO/CFA, ENRICO LORENZINI, University of Padova, Italy, JAMES PHILLIPS, ROBERT REASENBERG, SAO/CFA — SR-POEM is a payload we are developing for detecting a possible violation of the weak equivalence principle (WEP) while on a free-fall trajectory provided by a sounding rocket. In the experiment, two test mass assemblies will be allowed to free fall during 8 drops of 40s each. The drops will be separated by payload inversions. We discuss the various sources of spurious test-mass accelerations, emphasizing those that could mimic a WEP violation signal. The studies carried out thus far indicate that the mission uncertainty requirement of σ ($\Delta g/g$) < 10^{-16} can be achieved with the inversions, which cancel most of the systematic errors. We address those errors that do not cancel and suggest approaches to control them. Spurious accelerations arise, for example, from the gravity due to the payload mass distribution and variation of surface potential on the test masses and nearby electrodes. We also present the results of detailed calculations which allow us to constrain most of the spurious accelerations within acceptable limits during the measurement phase. Systematic errors due to attitude control and flight dynamics will be examined briefly.

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Biju Patla SAO/CFA

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