

Abstract Submitted
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A WEP Test on a Sounding Rocket¹ ROBERT REASENBERG, BIJUNATH PATLA, JAMES PHILLIPS, EUGENIU POPSECU, SAO — We are developing a payload for detecting a possible violation of the weak equivalence principle (WEP) while on a sounding rocket's free-fall trajectory. We estimate an uncertainty of 10^{-16} from a single flight. The experiment consists of 8 drops, each lasting 40 s, of the two test mass assemblies (TMA). The instrument orientation will be reversed between successive drops, which reverses the signal but leaves most systematic errors unchanged. Each TMA consists of a pair of cubes connected by a short rod. The four cubes are in a square lying in a plane perpendicular to the symmetry axis (z axis) of the payload and close to its CM. At a distance of 0.3 m along the z axis, there is a highly stable plate that holds four of our tracking frequency laser gauges, which measure the distances to the cubes. The TMA are surrounded by capacitance plates, which allow both measurement and control of position and orientation. During the brief night-time flight, the payload outside temperature drops slowly from around 300 K. Temperature stability of the instrument is essential and we can achieved it passively. This work was Supported in part by NASA grant NNX08AO04G.

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