

Abstract Submitted  
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**Equivalence-principle Analog of the Gravitational Red Shift**

MARIO SERNA, US Air Force Academy — To the best of our knowledge, the equivalence-principle analog of the gravitational red shift in special relativity has never been measured. This red shift is the loss of synchronization associated with observers along a rigid beam being accelerated along a path preserving Born rigidity. We discuss some special conditions which simplify its experimental observation. Consider two initially synchronized clocks on the ends of a rigid rod that begins at rest and then accelerates along its length to a final velocity. Special relativity predicts that the two clocks initially synchronized will be shifted by an amount proportional to  $\Delta\tau \approx Lv/c^2$ . Experimental accuracy is just beginning to make this effect observable. We estimate the tolerance of the effect to experimental realities. If validated this new effect may one day aid in understanding and enhancing future ultra precision navigation systems.

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