

Abstract Submitted
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gpb, the Damocles sword hanging over GR. RUSSELL COLLINS, retired, UT Austin — The gpb experiment is now testing the GR concept of curved space. A gyroscope, orbiting earth in low polar orbit, should precess in the direction of earth's spin because of spin-orbit coupling. If this tiny precession of 43 msec/yr is found, it will favor GR. Failure to find this precession will doom GR and all other metric theories of gravity. Space itself will be found, experimentally, to be flat. My interest arises from mass-metric relativity (1), a scalar theory of gravity in flat space. In MMR, mass is not a constant. Gravity and speed increase mass, and quantum mechanics tells us that meter sticks will shrink. In MMR, it is not space that is distorted but rather it is our measuring instruments. Space remains Euclidean, and Newtonian gravity works fine. MMR accounts equally well with GR for the classical tests of GR, but differs in its predictions for the gpb. Instead of +43 msec/yr, MMR predicts -19 msec/yr. There is no spin-orbit coupling, but the geodetic perturbation of the sun causes a backward precession. The Stanford gpb has flown, the data has been collected, and the analysis is nearly complete and is scheduled for announcement next April. Much of physics may need revision. (1) Collins, R.L., arXiv 0012059 (2000).

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