

Abstract Submitted
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Gravity Probe B Experiment Error¹ BARRY MUHLFELDER, G. MAC KEISER, JOHN TURNEAURE, Stanford University — The GP-B experiment error results from both statistical and systematic sources. Excluding all systematic effects, the on-orbit gyroscope readout noise provides an experiment error noise floor limit of 0.2 marcsec/yr. We have also evaluated the effects of more than 200 systematic sources including: thermal sensitivities of the readout system, nonlinearities in the telescope readout, roll phase uncertainty, and spacecraft anomalies. The impact of these and other systematic effects has been mitigated by the development of a variety of techniques. Study of the flight data revealed two unanticipated gyroscope behaviors. These two behaviors, a slowly varying readout scale factor and a specific type of Newtonian torque, are now well understood, and have been incorporated into the data analysis model. Residual errors associated with these and other gyroscope behaviors are included as part of the overall systematic error. The consistency of the results for the four independent gyroscopes provides a crosscheck of gyroscope specific error. Proper summing of all errors for the four gyroscopes gives the experiment error. We will present the most current numerical assessment of all GP-B error sources and will give the associated experiment error.

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