

Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Performance of the Gravity Probe B Inertial Reference Telescope¹ SUWEN WANG, Stanford University, JOHN GOEBEL, NASA Ames Res. Ctr., JOHN LIPA, JOHN TURNEAURE, Stanford University — Gravity Probe B uses a cryogenic optical telescope as an inertial reference system for the gyroscopes and as a sensor for the pitch and yaw part of the attitude control of the spacecraft. The telescope was made primarily of fused quartz that was bonded together using a potassium hydroxide bonding technique developed for the program. Roof prisms located at the telescope focal plane were used to divide the guide star image to give the pitch and yaw error information. The telescope met all the pre-flight requirements and the performance in flight was consistent with the ground test results. Due to a larger-than-expected space vehicle pointing error the telescope occasionally operated beyond its designed linear range. This increased two contributions to the systematic error for the science data analysis which were from the non-linearity of the pointing response and the scale factor change due to guide star color variation. The non-linearity error can be corrected using a cubic model for the response as a function of pointing angle derived from the flight data. Other systematic errors from the telescope are predominantly bias variations which have an insignificant effect on experiment error.

¹Research supported by NASA under contract NAS8-39225

William Bencze
Stanford University

Date submitted: 12 Jan 2007

Electronic form version 1.4