

Abstract Submitted
for the APR07 Meeting of
The American Physical Society

The Gravity Probe B SQUID Readout Detector¹ BARRY MUHLFELDER, BRUCE CLARKE, Stanford University, GREGORY GUTT, Boeing Company, JAMES LOCKHART, SF State Univ; Stanford Univ., MING LUO, Stanford University — We describe the DC SQUID-based readout system used on-orbit to measure the spin axis orientation of the GP-B gyroscopes. This system uses thin-film four-turn superconductive pickup loops to inductively couple the London moment signals of the spinning gyroscopes to the SQUID detectors. The SQUID detectors were mounted within niobium packages that provided magnetic shielding and allowed for active temperature control of the SQUIDs. EMI mitigation techniques were used to isolate the SQUIDs from spacecraft and ambient RFI noise sources. We discuss the design and construction of the readout system hardware and describe the extensive testing of the system prior to launch. We present on-orbit SQUID noise results demonstrating a gyroscope spin axis orientation resolution of 1 marc-sec in less than 10 hours of integration time, sensor harmonic distortion of less than 0.01%, SQUID bias and gain temperature sensitivity coefficients, and calibration results. The experiment error associated with the measured SQUID noise is less than 0.2 marc-sec/yr.

¹Research supported by NASA under contract NAS8-39225

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Date submitted: 12 Jan 2007

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