Abstract Submitted
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SQUID Control, Temperature Regulation, and Signal Processing Electronics for Gravity Probe B[1] JAMES LOCKHART, SF State Univ; Stanford Univ, BARRY MUHLFELDER, JIE LI, BRUCE CLARKE, Stanford University, TERRY MCGINNIS, PETER BORETSKY, Lockheed-Martin Corp, GREGORY GUTT, Boeing Company — We designed, built, tested, and operated on-orbit a set of space-qualified electronics to (a) provide high-bandwidth and low-noise flux-locked-loop operation of four SQUID detectors, (b) regulate the temperature of the SQUIDs to better than 5 μK rms, and (c) digitize and provide digital filtering of the SQUID signals and SQUID temperature readings. Particular attention was paid to designing a system which would be stable in the presence of large ambient temperature variations, the energetic particle cosmic ray environment of space, and electromagnetic interference. The flux-locked-loop electronics combined high dynamic range with low noise. The SQUID temperature control system employed a digital feedback system providing adequate disturbance rejection at a critical signal frequency. The system yielded on-orbit SQUID performance limited by the intrinsic SQUID noise.

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