

Multi-channel HTS SQUID Magnetometer System for Magnetocardiograms

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We have developed a multi-channel magnetocardiograph system by using single layer YBCO direct coupled superconducting quantum interference devices (SQUID). The YBCO SQUID magnetometers were prepared on STO(100) bicrystal substrates with misorientation angle of 30° by pulsed laser deposition technique and standard photolithography. Typical white noise level of the SQUID magnetometers was about 40 fT/Hz^{1/2} above 100 Hz. The magnetocardiograph system employed 6 sensing channels and also a sliding bed for scanning measurements. The sliding bed was made from non-magnetic materials and locomotive in three axes for a wide area measurement. The multi-channel SQUID system showed stable operation in moderate magnetic-shield-room environment. In ordinary operation of moving object below liquid nitrogen dewar and gantry, we did not find any noise contribution from metallic components of the sliding bed. Clear MCG signals could be recorded in real time with high S/N ratios better than 80. In preliminary results, the prototype HTS SQUID MCG system exhibited advantages over liquid helium device system with lightweight and easy handling.

keywords : YBCO thin films, SQUID, Magnetocardiograph, Magnetic field noise