1261.rtfAr-7

Measurement of Magnetocardiogram in a weak MSR using YBCO dc SQUID magnetometers.

K. Yu , I. S. Kim, Y. H. Lee, K. W. Kim and Y. K. Park

Biomagnetism Research Center, Korea Research Institute of Standards and Science Yusong PO Box 102, Daejeon 305-600, Republic of Korea

*Corresponding author: e-mail: inskim@kriss.re.kr, Phone: +82 42 868 5238, Fax: +82 42 868 5475

Single layer direct-coupled YBCO SQUID magnetometers have been designed and fabricated for the purpose of MCG measurements in a magnetically disturbed environment. The magnetometers consisting of 16 parallel loop pickup coil were prepared on 10 mm × 10 mm STO bicrystal substrates. The direct coupled YBCO SQUID magnetometers have field sensitivity B_Φ of 4.5 nT/Φ_0 and magnetic field noise B_N of 30 fT/Hz$^{1/2}$ measured at 100 Hz, and exhibit very stable FLL operation under magnetically noisy environment.

We have performed various MCG measurement tests by the methods of single SQUID magnetometer, and 1-st order electronic gradiometers of axially arranged and vertically arranged SQUID sensors. Measurement results of MCG signals in a weak-MSR are discussed.

References

[1] F. Ludwig, A. B. M. Jansman, D. Drung, M. O. Lindstroem, S. Bechstein, J. Beyrer, J. Flokstra, T. Schurig, "Optimization of direct-coupled high-T_C SQUID magnetometers for operation in magnetically unshielded Environment," *IEEE Trans. Appl. Supercond.*, vol. 11, pp. 1315-1318, (2001).

[2] I. S. Kim, J. M. Kim, H. R. Lim, Y. K. Park, "Development of a high-T_C gradiometer system," *IEEE Trans. Appl. Supercond.*, vol. 11, pp. 1399- 1362, (2001).

[3] S. Kuriki, H. Oyama, A. Hayashi, S. Hirano, T. Wahio, "Development of a high-T_C SQUID based magnetometer system for MCG measurement.", *IEICE Trams. Electron.*, vol. E85-C, NO. 3, pp. 670- 676, (2002).

[4] H.E. Horng, S.Y. Hung, J.T. Jeng, S.H. Liao, S.C. Hsu, J. C. Hwang, H.C. Yang, "Biomagnetic measurements with HTS SQUID magnetometers in moderate shielded environments.", *IEEE Trans. Appl. Supercond.*, vol. 13, pp. 381-384, (2003).