

Measurements of Rat MCG Signals by Using High- T_C SQUID Magnetometer System

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We have fabricated high- T_C SQUID magnetometers to measure magnetocardiographic signals from small animals, aiming to use the magnetometers in a basic physiological study of cardiac functions. Magnetic field noise of the high- T_C SQUID magnetometers measured in BMSR was about $35 \text{ fT/Hz}^{1/2}$ with $1/f$ corner frequency of 3 Hz. For the rat MCG measurements, we used a single channel SQUID magnetometer system. Rats with weights of about 400 g were anesthetized and fixed on wood table during measurements. The SQUID sensor was put directly above the heart of a rat. The heart beat signals were recorded in the frequency range of dc to 200 Hz. With the gap of 7 mm of the dewar tail, very clear signals of about 20 pT in peak to peak could be detected in the rats' MCG. In this pilot study, we measured and analyzed the rat MCG signal recordings for a healthy and a hypertrophy rat for further study of animal models of heart disease.

Keywords : high- T_C SQUID, magnetocardiogram, laboratory rat, small animal MCG