Operation Characteristics of Whole-head Magnetoencephalography System

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We constructed two helmet-type magnetoencephalography systems covering the whole part of the human head. The numbers of channel are 128 and 150. The SQUID sensors are double relaxation oscillation SQUID and room-temperature dc-amplifiers were used to detect the output voltages of the SQUID. First-order axial gradiometers having a baseline of 50 mm were used for the magnetic sensors. The insert of the helmet sensor array is made of materials having low thermal conductivity, such as fiber-glass reinforced plastic for the mechanical support, and Magnetic wires for the signal lines. A helmet tail liquid He dewar having boil-off rate of about 12 L per day was used for cooling the SQUID gradiometers. The magnetic field noise of the system is about 5 fT/sqrt(Hz) at 100 Hz, inside a magnetically shielded room. By using the systems, we could measure brain magnetic signals of spontaneous activity or evoked responses.

Keywords: SQUID, magnetic noise, magnetoencephalography