

Abstract Submitted
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Unshielded magnetoencephalography measurements with optically-pumped atomic magnetometers TENG WU, RUI ZHANG, WEI XIAO, YUDONG DING, YULONG FENG, XIANG PENG, Peking University, LIANG SHEN, Beijing University of Posts and Telecommunications, CHENXI SUN, YULONG WU, YUCHENG YANG, ZHAOYU ZHENG, XIANGZHI ZHANG, JINGBIAO CHEN, HONG GUO, Peking University — Understanding the relationship between brain activity and specific mental function is important for medical diagnosis of brain symptoms, such as epilepsy. Magnetoencephalography (MEG) is a promising non-invasive method for locating the brain disease. MEG uses an array of high sensitivity magnetometers, such as superconducting quantum interference devices (SQUIDS), to record magnetic fields generated from electrical currents occurring naturally in the brain. Recent years have seen rapid developments in optically pumped atomic magnetometers (OPMs), both in sensitivity and portability, which have made the replacement of SQUIDS with OPMs a general tendency within the MEG community. Currently, nearly all the MEG measurements are performed in a magnetically shielded room. Here we introduce an unshielded MEG system based on OPMs. We successfully observe the alpha-rhythm MEG signals related to open and closed eyes, and a clear auditory evoked magnetic field signal in unshielded earth field. Combined with further improvements in the miniaturization of the atomic magnetometer, our method is promising to realize a practical movable and wearable MEG system without magnetic shielding, open new applications in clinical research, and bring new insights into the medical diagnosis of brain symptoms.

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