

Abstract Submitted
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Magnetoencephalography with Optically Pumped Atomic Magnetometers PETER SCHWINDT, ANTHONY COLOMBO, YUAN-YU JAU, TONY CARTER, CHRISTOPHER BERRY, AMBER YOUNG, Sandia National Laboratories, JIM MCKAY, Candoo Systems, MICHAEL WEISEND, The Wright State Research Institute — We are working to develop a 36-channel array of optically pumped atomic magnetometers (AMs) to perform magnetoencephalography (MEG) with the goal of localizing magnetic sources within the human brain. The 36-channel array will consist of nine 4-channel sensor modules where the channels within each sensor will be spaced by 18 mm and each sensor will cover a 40 mm by 40 mm area of the head. In a previous 4-channel AM prototype, we demonstrated the measurement of evoked responses in both the auditory and somatosensory cortexes. This prototype had a $5 \text{ fT/Hz}^{1/2}$ sensitivity. In the current version of the AM under development we are maintaining the previous sensitivity while implementing several improvements, including increasing the bandwidth from 20 Hz to more than 100 Hz, reducing the separation of the active volume of the AM from exterior of the sensor from 25 mm to 10 mm or less, and reducing the active sensor volume by a factor >10 to $\sim 15 \text{ mm}^3$. We will present results on the performance of our most recent AM prototype and progress toward developing a complete MEG system including a person-sized magnetic shield to provide a low-noise magnetic environment for MEG measurements.

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