

A Los Alamos 16-channel Rb magnetometer

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Optically pumped magnetometers are promising due to high sensitivity and simple turn-key operation. However, implementing full-head magnetoencephalography (MEG) or multi-channel magnetocardiography (MCG) systems with hundreds of sensors is still expensive. We have developed a 16-channel system capable of fT sensitivity using a large pancake Rb cell containing helium buffer gas with broad nearly parallel pump and probe beams [1]. The approach can potentially reduce price by an order of magnitude to make MEG and multi-channel MCG attractive inexpensive clinical and research tools. We will show the latest results, including 16-channel MCG demonstration [2].

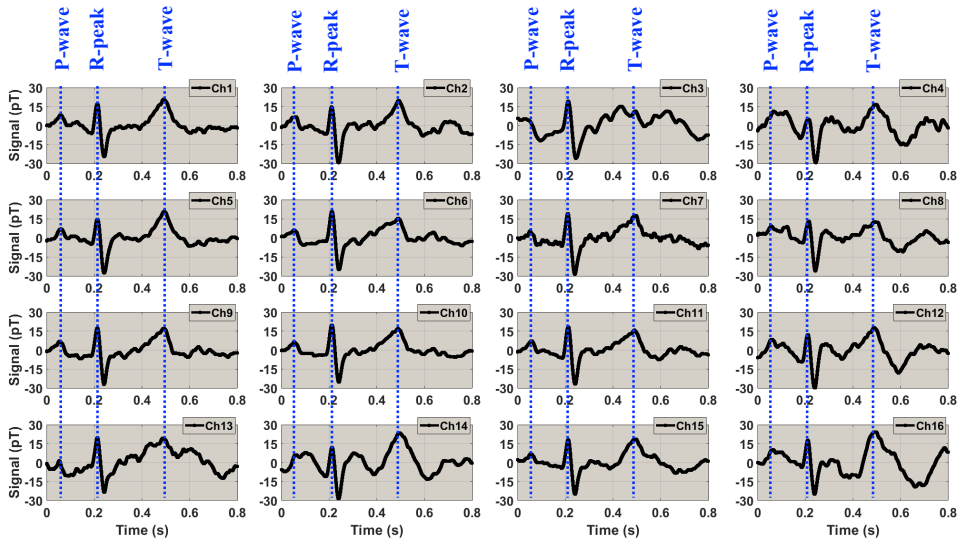


Figure 1. Raw human MCG signals, simultaneously recorded by the Los Alamos 16-channel optically pumped magnetometer with a scan time of 0.8 s.

[1] Y. J. Kim and I. Savukov, Highly sensitive multi-channel atomic magnetometer, *IEEE Sensors Applications Symposium*, 1-4 (2018).

[2] Y. J. Kim, I. Savukov, and S. Newman, Magnetocardiography with a 16-channel fiber-coupled single-cell Rb optically pumped magnetometer, *Applied Physics Letters* **114**, 143702 (2019).