Source-localisation of auditory stimulation using wearable OPM MEG

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The optically-pumped magnetometer (OPM) has been used in wearable MEG, which could be applied in a wider field than SQUID MEG. [1] The source localisation in wearable OPM MEG is a critical issue for the application. In this study, we use a wearable OPM MEG system covering the contralateral aspects of the temporal lobes to map auditory cortex using stimulation of tones. The OPM MEG system has a 3D printed helmet for the subject. 17 sensors are inserted in the slot close to the scalp while 3 are mounted a bit distance away orthogonal to each other as references. Tones of 1000Hz lasting 100ms with ISI of 0.5s are applied to right ear for 200 trials. Fieldtrip is used to generate the timecourse and topography of auditory evoked response. DICS beamforming is performed for 1-40Hz with -0.5-0s as control and 0.25-0.3s as active window. The timecourse has shown the auditory evoked response with significant N200, which is used for source localisation. Beamforming has localised the source to the left temporal lobe, which is primary auditory cortex. This result demonstrates that wearable OPM MEG could well detect and localise the evoked response of auditory stimulation. It opens new possibility for scanning with head free to move, which could be quite beneficial for long time recording, patients with movement disorder and children.

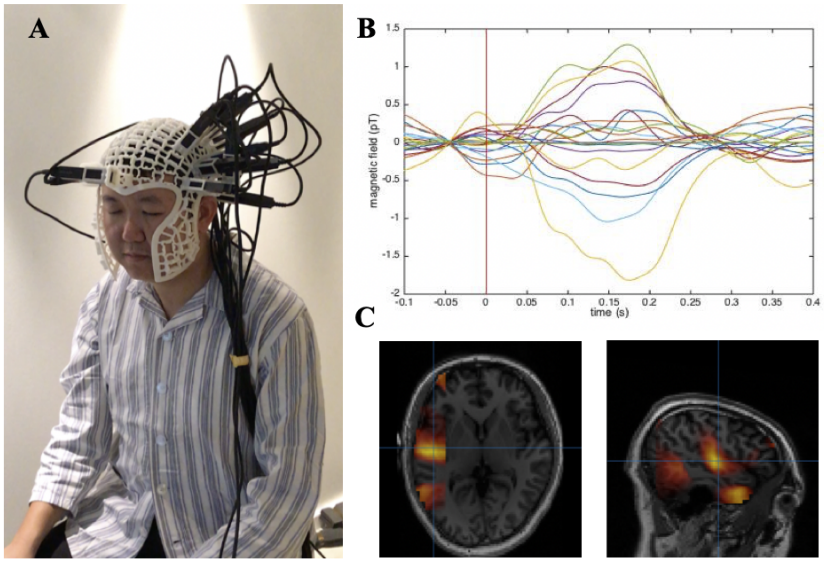

Figure 1. OPM MEG recording with wearable helmet (A). The timecourse of auditory evoked response (B) and source localisation using beamforming (C).

[1] Boto E, Holmes N, Leggett J, et al (2018) Moving magnetoencephalography towards real-world applications with a wearable system. Nature **62**, 8909 (2018).