**S1 Text**

Extended LMEM analysis of spatial patterns across planes

In the main text, we investigated MI spectra as a function of distance to the head centre. As the distance measure was computed as the vector norm from x, y, and z coordinates (see Methods), we here extend the analysis of individual planes. To this end, we report frequency-specific LMEM analyses modelling individual contributions of the three planes, e.g.

MIj = 𝛽0 + (𝛽1 + *S*1j) \* *x* + (𝛽2 + *S*2j) \* *y* + (𝛽3 + *S*3j) \* *z +* *e*j

For participant j, the modulation index is expressed as a combination of the intercept (𝛽0), the fixed effects of the components’ coordinates in x, y, and z plane (𝛽1, 𝛽2, 𝛽3), and an error term (ej ~ N(0,σ²)). We accounted for between-participant variation by specifying random slopes (S1j, S2j S3j). This way, we can gain further insight as to how each plane contributed to the overall head centre effects and how spectrally specific these effects are. The results are presented in S1 Table.