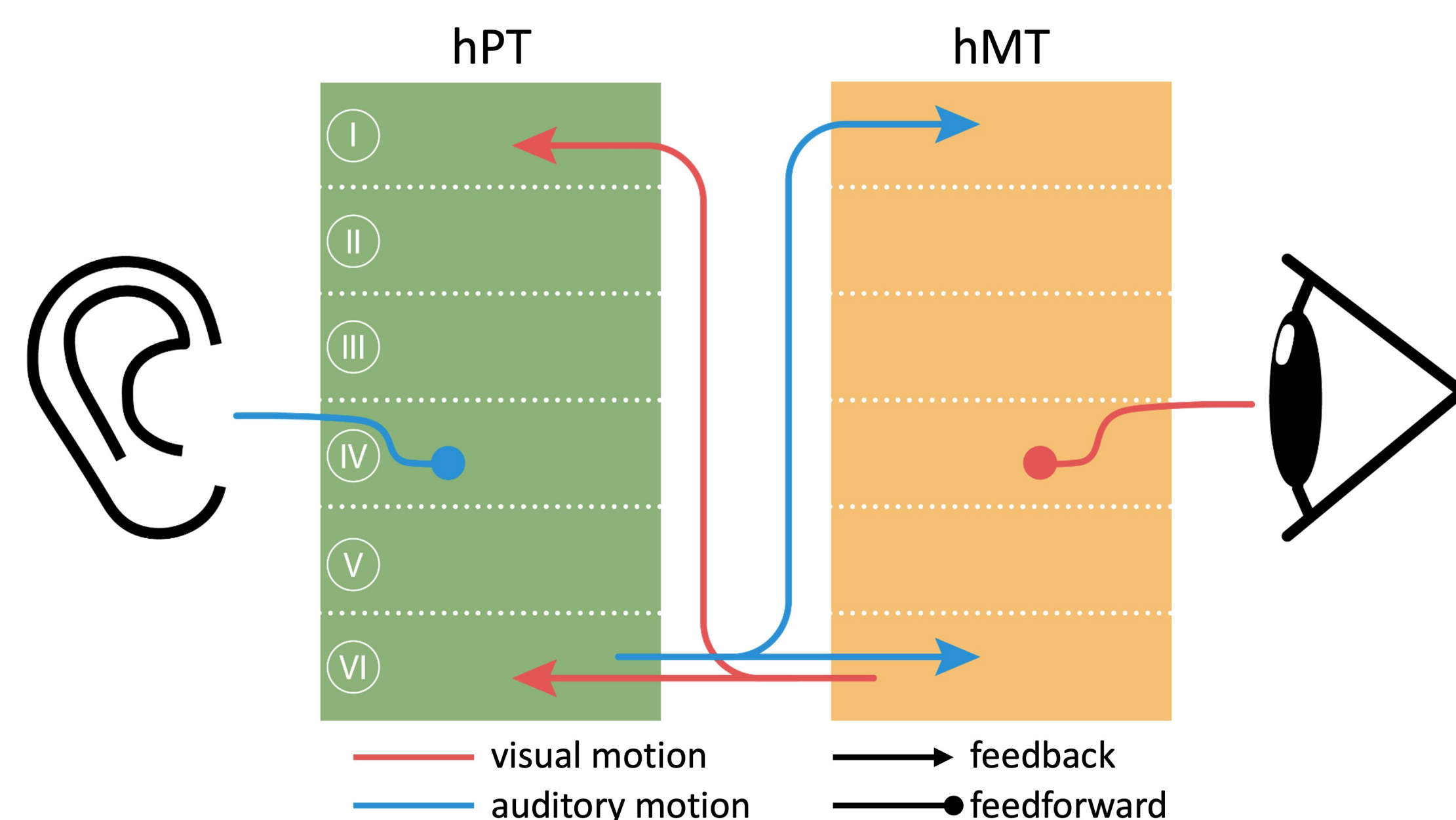


Introduction

- hMT+/V5 is highly specialized to process visual motion direction [1 - 2 - 3].
- It has been recently suggested that hMT+/V5 may also engage in crossmodal motion processing from the auditory modality [2] and that a structural direct path exists between visual and auditory motion selective areas [4].

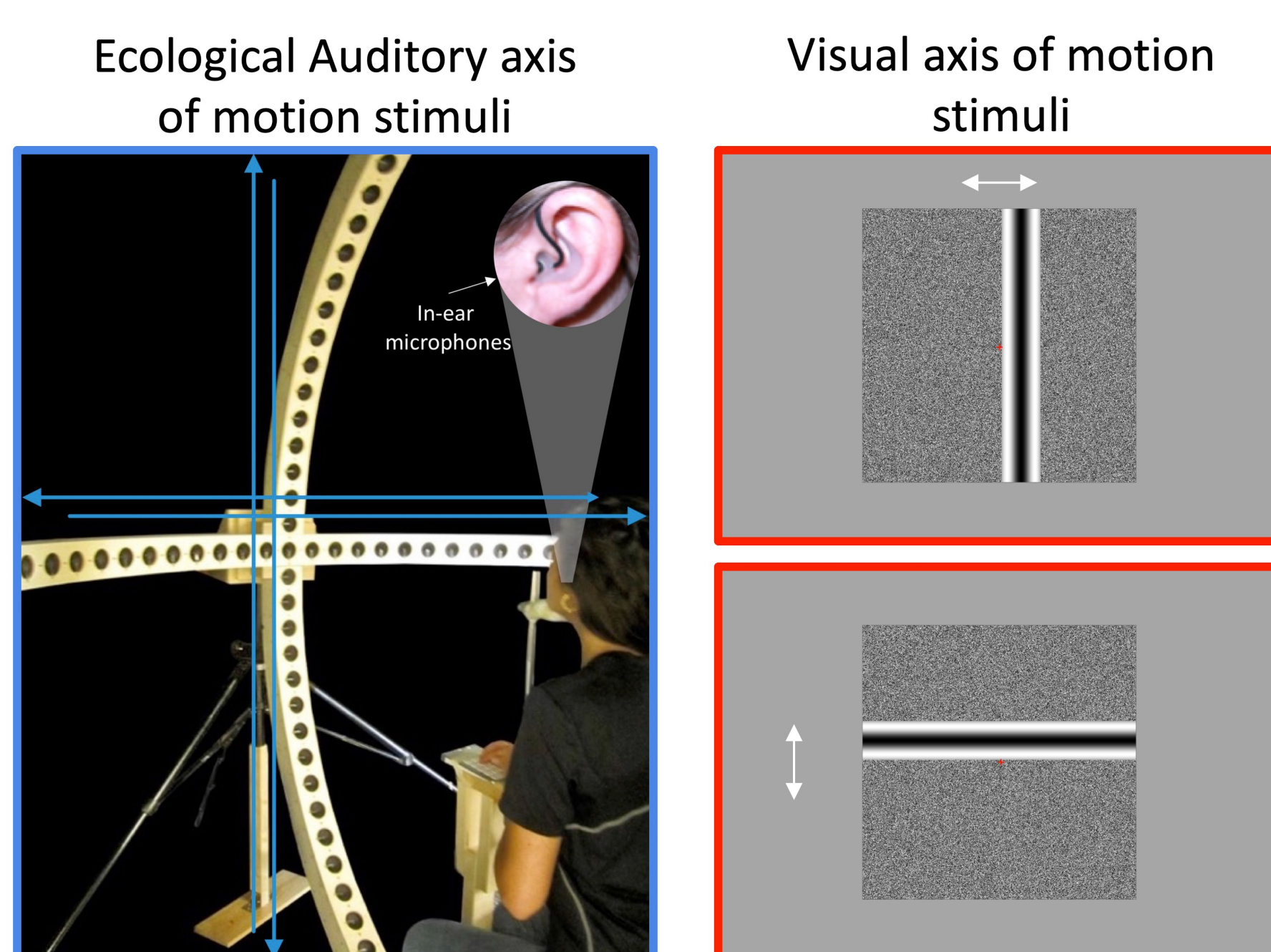
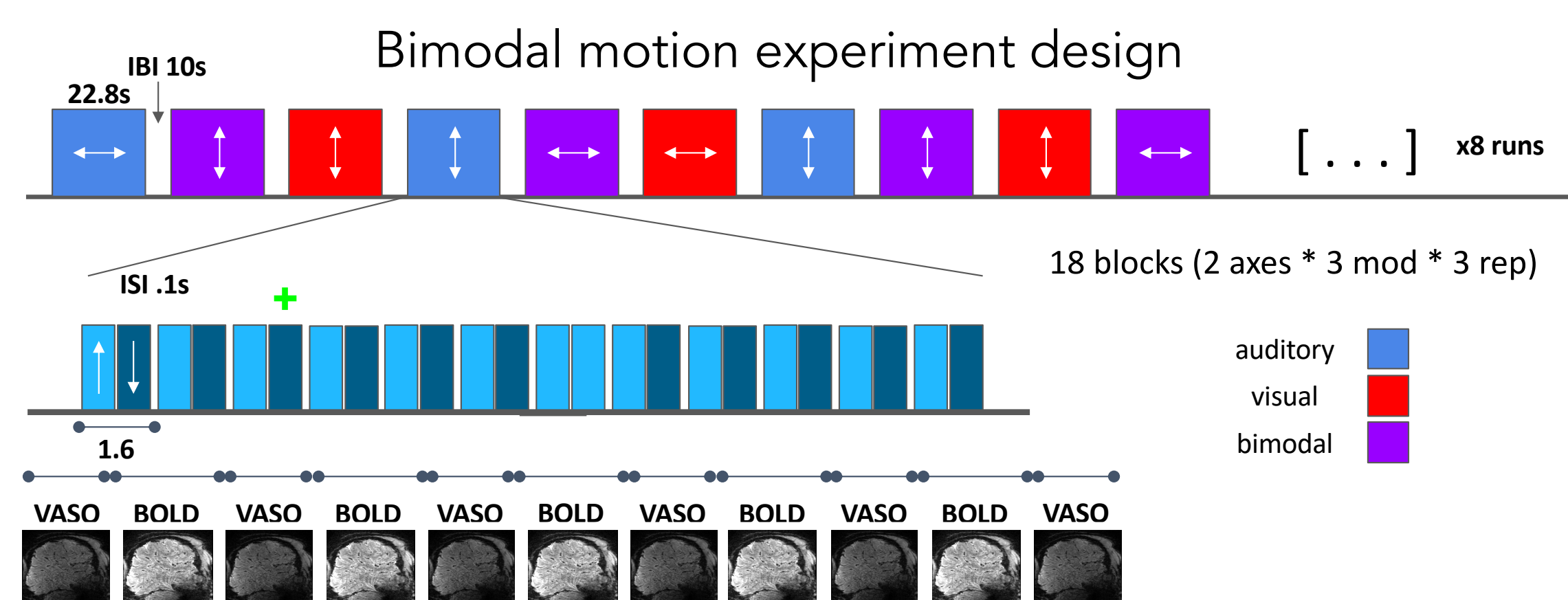
How is multisensory integration represented in hMT+/V5?

- We hypothesize that hMT+/V5 might encode visual and motion information in separate cortical layers in a feed-forward versus feed-back nature, respectively.
- We are characterizing the brain activity in the cortical depths using ultra high-field (UHF) fMRI with BOLD recording at high spatial resolution (.75mm isotropic).



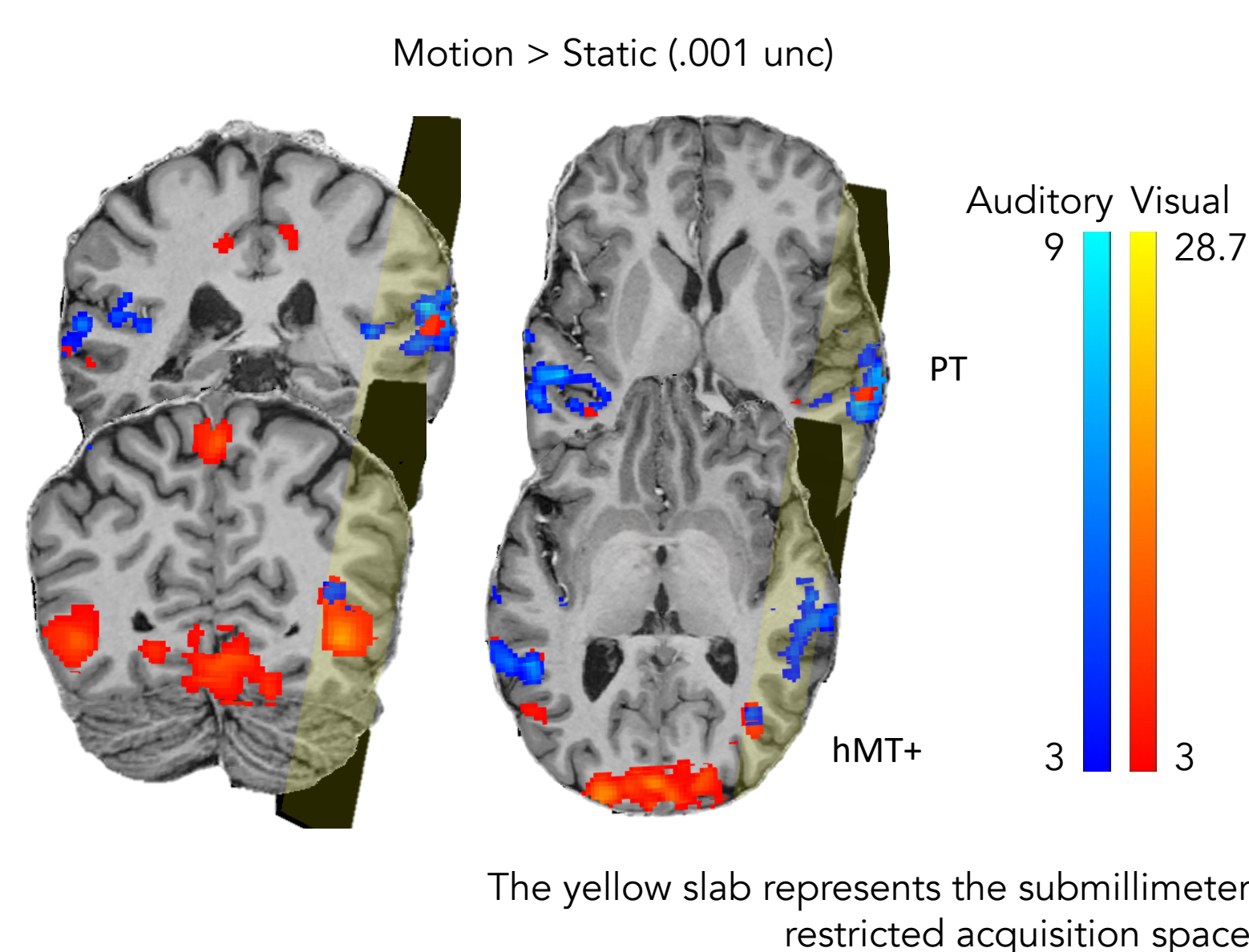
Materials and Method

- 1 run of visual motion localizer (Motion RDK > Static dots)
- 1 run of auditory motion localizer (ecological Motion sound > Static sound)
- 1 run of MT/MST localizer (Radial motion > Statci motion in two lateral hemifields)
- ~7 runs (10 min each) BOLD + VASO Bimodal motion in the cortil depths
- Eyetracker and Physiological (heart-beat and respiration) controls during each fMRI run

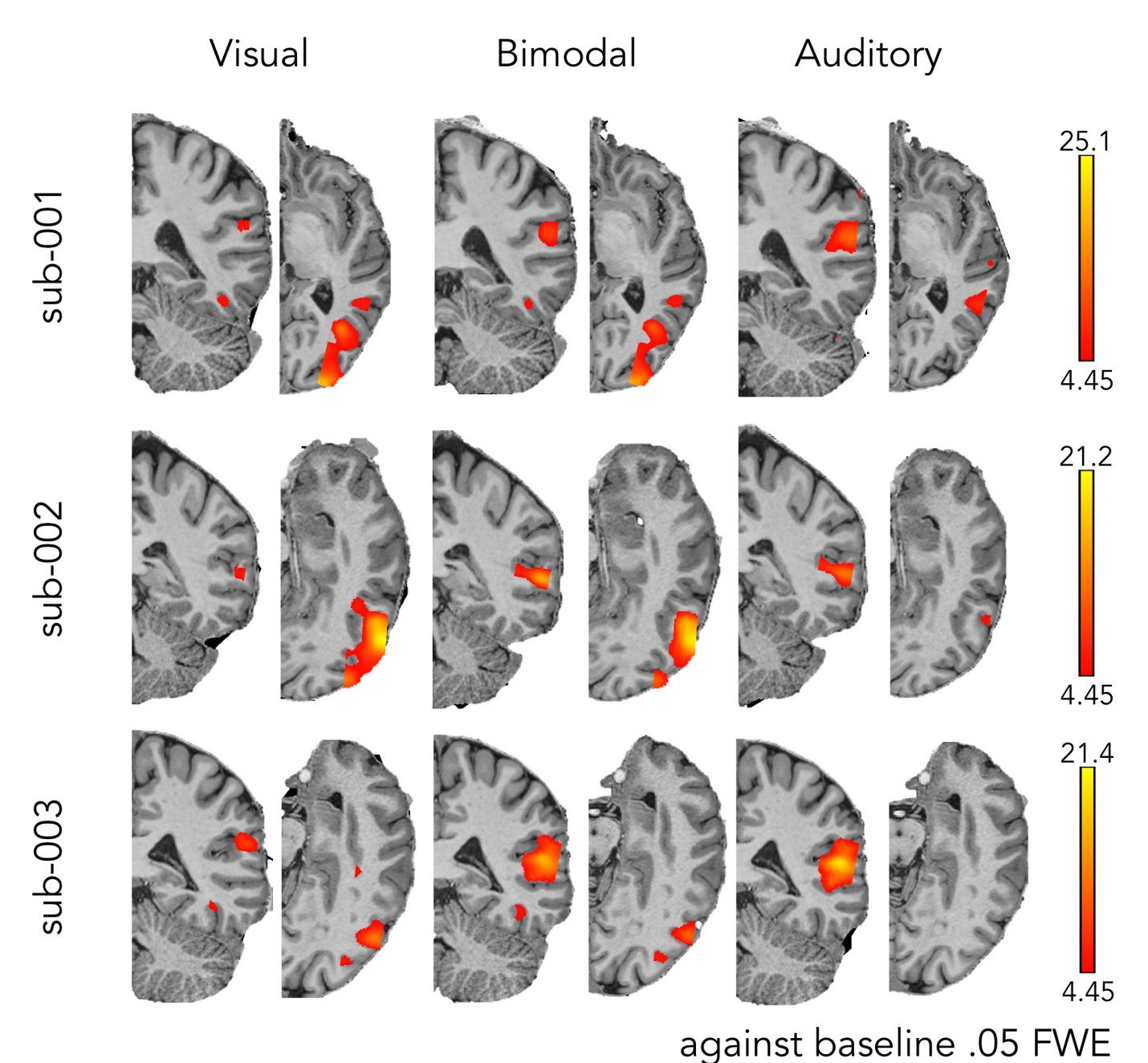


Preliminary results

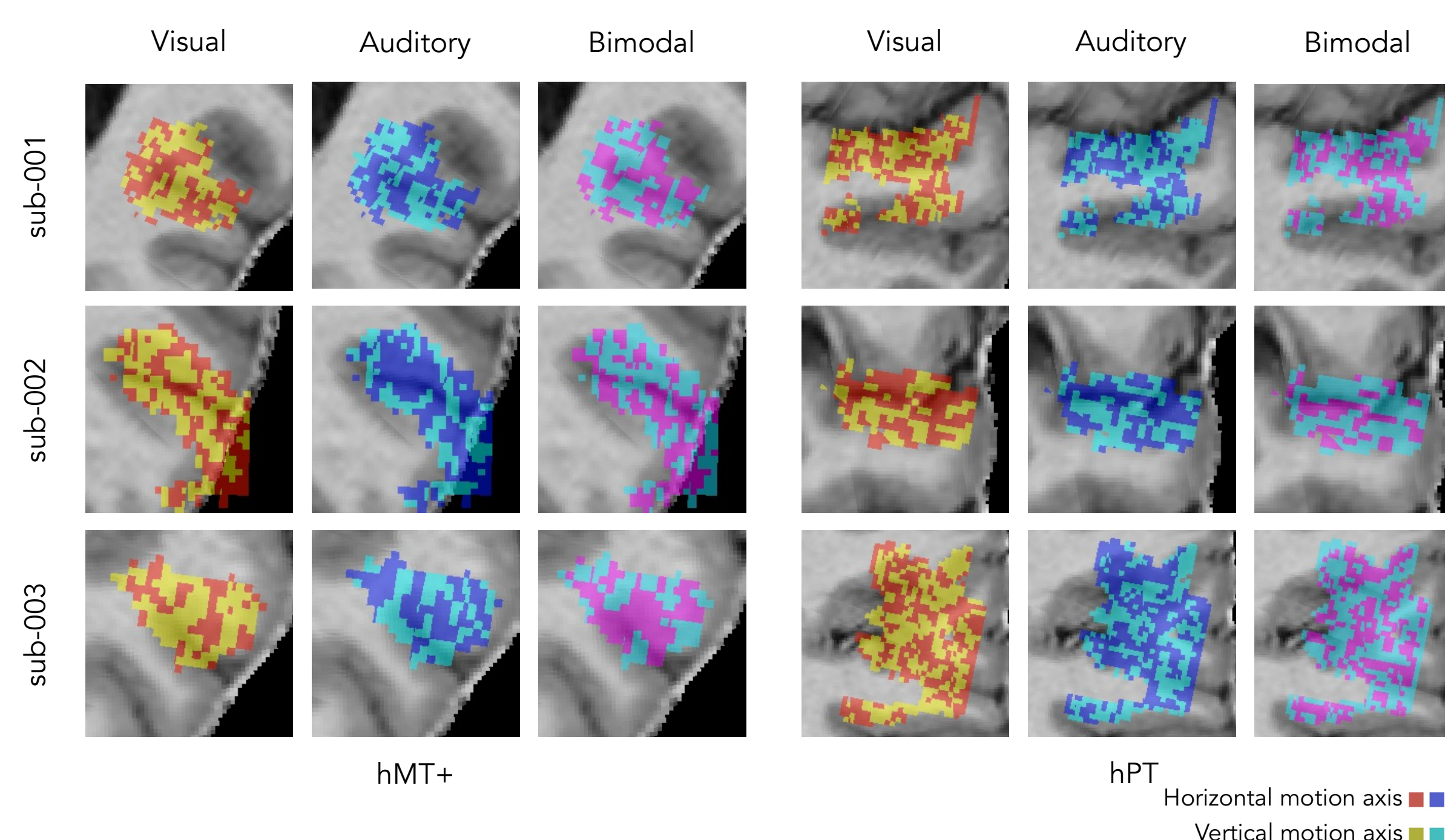
Visual and Auditory localizer (1 subject)



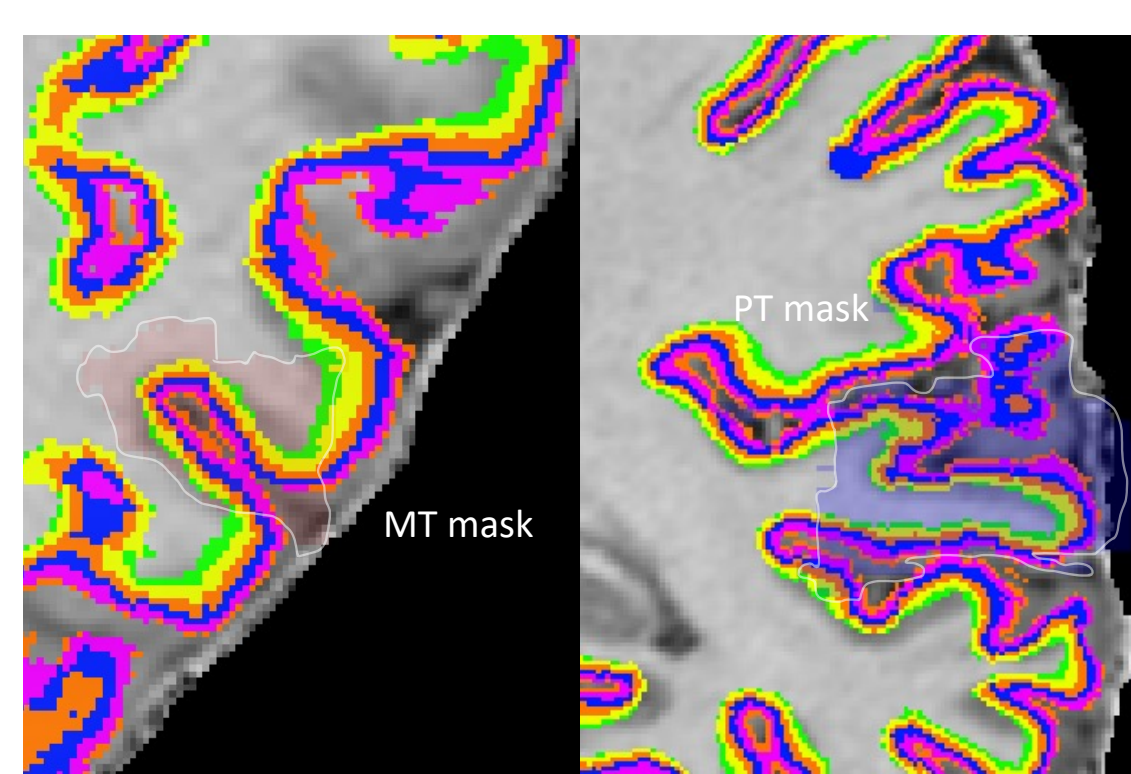
Main experiment univariate results (BOLD)



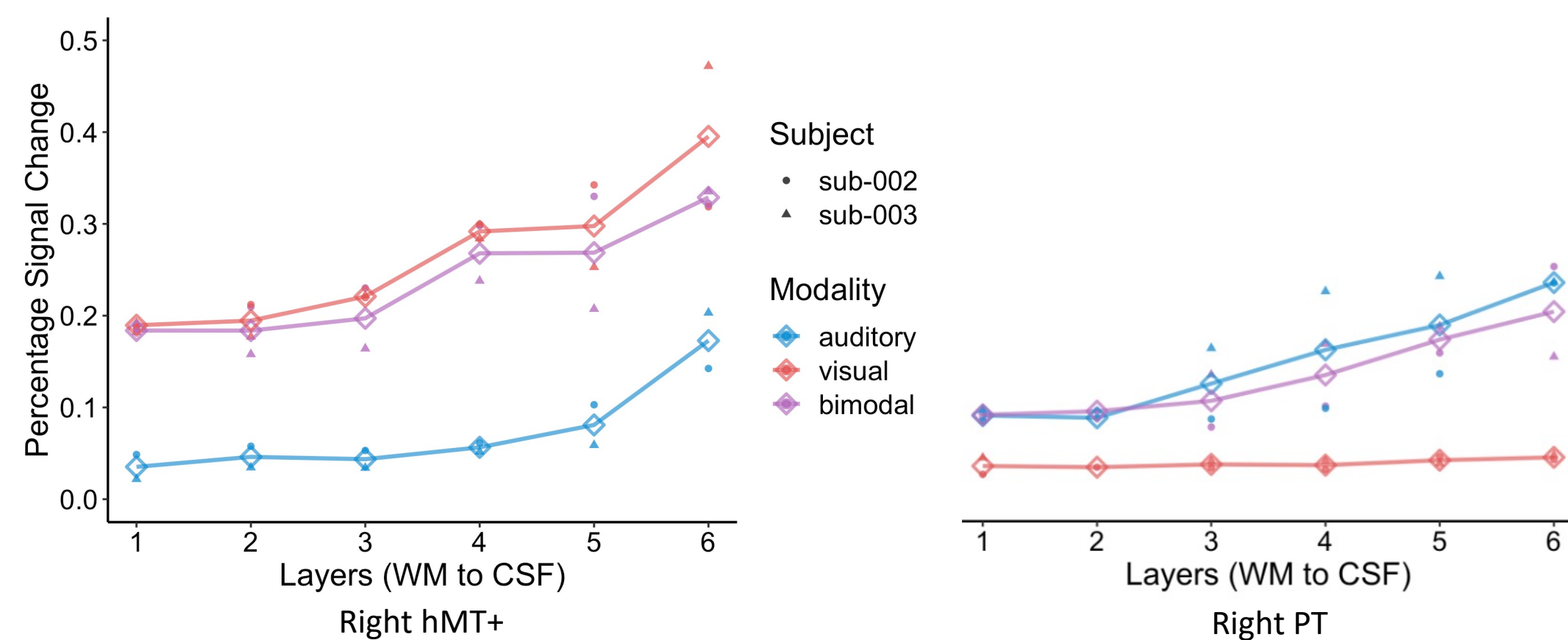
Horizontal vs. Vertical motion "winner take all" map



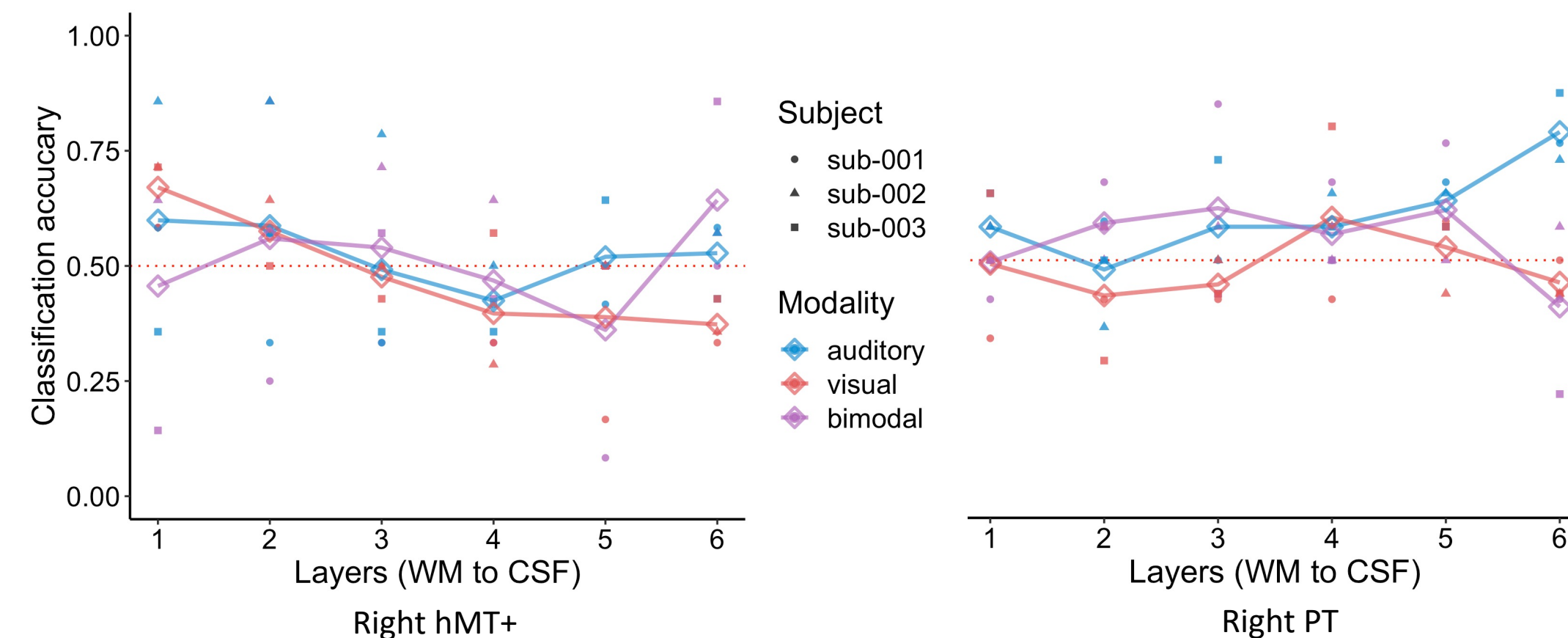
Layers profile (1 subject)



Percentage of signal change across the layers and modalities



MVPA Horizontal vs Vertical axes of motion



Conclusions

- Preliminary univariate results from the sub-millimeter have confirmed that in addition to a robust selectivity for visual motion, anterior portion of hMT+/V5 selectivity responds to moving sounds.
- Similarly, portion of Planum Temporale seems to responds to moving visual stimuli revealing how these two motion sensitive areas are engaged as a connected multisensory network.
- Cortical depth profiles are too preliminary to conclude whether auditory and visual motion signals are represented in different layers of hMT+/V5

Future directions: We are characterizing the brain activity in the cortical depths using UHF fMRI with BOLD combined with vascular space occupancy (VASO) recording [5] at high spatial resolution (.75mm isotropic).

References

- [1] Zimmerman et al., (2011), PLOsone; [2] Rezk et al., (2020), Current Biology; [3] Battal et al., (2019), J. Of Neuroscience; [4] Guturbay-Antolin et al., (2021), J. of Neuroscience; [3] Huber et al., (2018), Neuroimage;

Acknowledgement

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