SUPPLIMENTARY RESULTS:

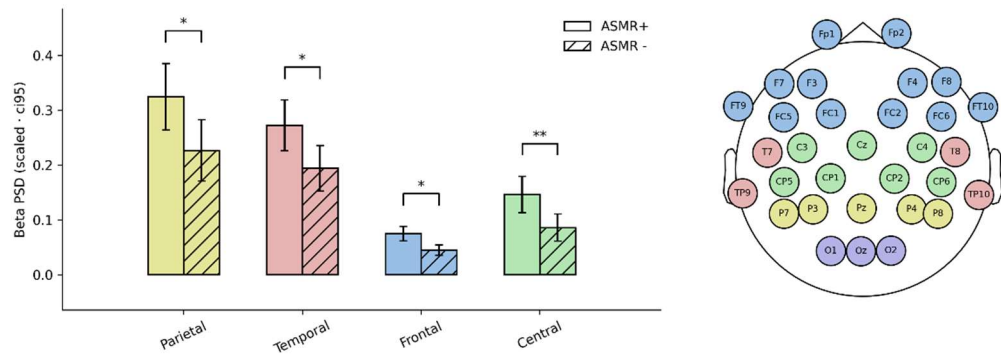PSD Region Wise Comparison Closed-eyes Condition:

Figure 1: Region-wise Power Spectral Density (PSD) comparison between ASMR+ vs ASMR- groups. Closed-eyes Beta frequency bands found to be significantly different between two groups in Parietal, Temporal, Frontal and Central regions.

*Table 1 Summary of Wilcoxon rank-sum tests on the Beta band under the Closed condition. Significance levels: * $p<0.05$, ** $p<0.01$.*

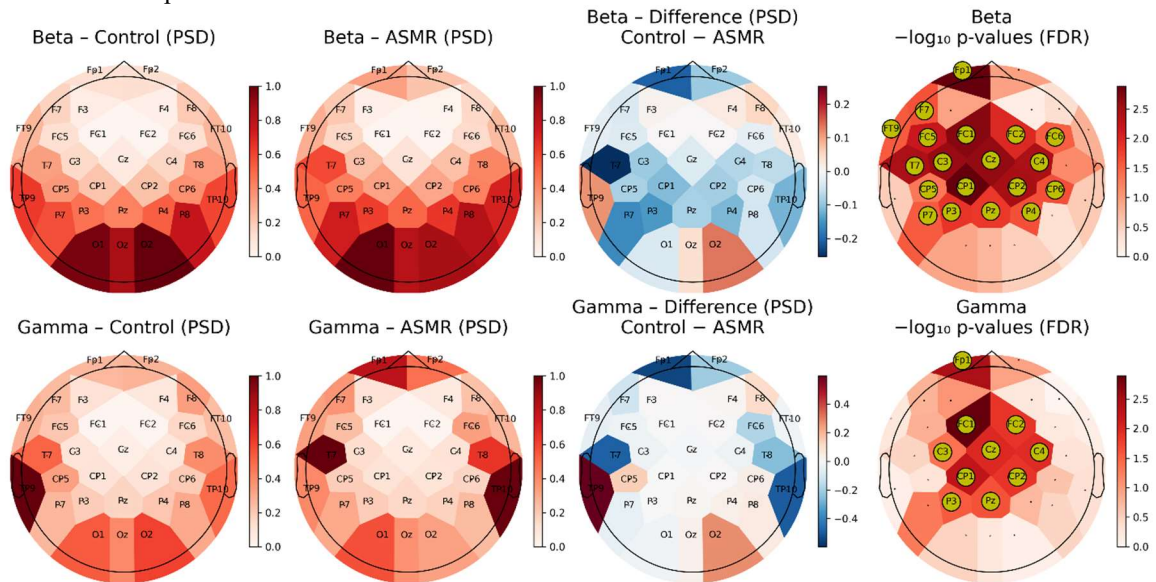| Band	Region	Condition	P(Corrected)
Beta	Parietal	Closed	0.0425*
Beta	Temporal	Closed	0.0351*
Beta	Frontal	Closed	0.0351*
Beta	Central	Closed	0.0055**

Channel Wise Comparison

Figure 2 Difference in mean PSD between ASMR- and ASMR+ participants during resting state closed-eyes condition. Pairwise comparisons were made between control (diagonal lines) and ASMR (no pattern) participants

*for each region, electrode group and frequency bands. The location of electrodes that comprise each group is indicated in the topographic map by the corresponding colour. * p $<$ 0.05.*

Machine Learning Results using PSD closed-eye condition and HFD closed-eye condition:

Table 2 Subject-level performance (mean ± SD over five seeds); AUC-ROC is reported at the sample level. For PSD features of closed-eyes condition between ASMR- Vs. ASMR+.

Model	F1 Score	Accuracy	Precision	Recall	AUC ROC
SVM	24.39 ± 0.00	32.25 ± 0.00	20.00 ± 0.00	31.25 ± 0.00	30.44 ± 0.08
Random Forest	39.00 ± 2.80	39.35 ± 2.69	39.00 ± 2.80	39.16 ± 2.74	41.60 ± 0.92
Mamba	36.72 ± 3.73	38.06 ± 4.20	37.36 ± 4.42	38.54 ± 4.31	39.19 ± 4.38
Transformer	23.94 ± 5.97	25.80 ± 6.03	23.20 ± 6.49	26.33 ± 6.06	28.87 ± 3.48

Table 3 Subject-level performance (mean ± SD over five seeds); AUC-ROC is reported at the sample level. For PSD features of open-eyes condition between ASMR- Vs. ASMR+.

Model	F1 Score	Accuracy	Precision	Recall	AUC ROC
SVM	59.211 ± 0.000	61.290 ± 0.000	62.879 ± 0.000	60.625 ± 0.000	57.894 ± 0.000
Random Forest	56.066 ± 1.746	56.129 ± 1.767	56.310 ± 1.859	56.250 ± 1.810	55.889 ± 1.989
Mamba	46.647 ± 8.912	47.097 ± 8.716	47.066 ± 8.963	47.292 ± 8.562	48.481 ± 4.663
Transformer	67.708 ± 0.000	67.742 ± 0.000	67.780 ± 0.161	67.750 ± 0.093	66.535 ± 0.852

Table 4 Subject-level performance (mean ± SD over five seeds); AUC-ROC is reported at the sample level. For HFD features of closed-eyes condition between ASMR- Vs. ASMR+.

Model	F1 Score	Accuracy	Precision	Recall	AUC ROC
SVM	35.417 ± 0.000	35.484 ± 0.000	35.417 ± 0.000	35.417 ± 0.000	45.012 ± 0.000
Random Forest	37.669 ± 3.954	38.065 ± 3.534	37.626 ± 4.032	37.875 ± 3.651	43.995 ± 1.813
Mamba	33.850 ± 5.402	34.194 ± 5.398	33.937 ± 5.479	34.375 ± 5.326	43.053 ± 2.824
Transformer	29.403 ± 7.167	29.677 ± 7.356	29.496 ± 7.380	29.875 ± 7.460	37.046 ± 1.901