

**Probing the chiral phase transition with valence overlap fermions  
and  $N_f = 2$  flavours of dynamical Wilson fermions**

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Abstract: Overlap fermions are a powerful tool to investigate the chiral and topological structure of the vacuum, as well as the thermal states of QCD. We study various chiral and topological aspects of the phase transition with  $N_f = 2$  flavours of light dynamical  $\mathcal{O}(a)$  improved Wilson fermions, using valence overlap fermions as a probe. In particular, we study the spectral density, localisation properties and the chiral structure of the eigenmodes in the vicinity of the chiral phase transition on  $16^3 \times 8$  lattices generated by the DIK collaboration. The results are compared to chiral random matrix theory.