19th International Conference on QCD in Extreme Conditions (XQCD 2023)

Contribution ID: **42**   Type: **Poster**

QCD Anderson transition with overlap valence quarks on a twisted-mass sea

Wednesday 26 July 2023 19:35 (25 minutes)

In this work we probe the QCD Anderson transition by studying spectral distributions of the massless overlap operator on gauge configurations created by the *twisted mass at finite temperature collaboration* (tmfT) with 2+1+1 flavors of dynamical quarks and the Iwasaki gauge action. We assess finite-size and discretization effects by considering two different lattice spacings and several physical volumes, and mimic the approach to the continuum limit through stereographic projection. Fitting the inflection points of the participation ratios of the overlap Dirac eigenmodes, we obtain estimates of the temperature dependence of the mobility edge, below which quark modes are localized. We observe that it is well-described by a quadradic polynomial and systematically vanishes at temperatures below the pseudo-critical one of the chiral transition. In fact, our best estimates within errors overlap with that of the chiral phase transition temperature of QCD in the chiral limit.

arXiv-Link to the paper

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Session Classification: Poster session