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Effective Dimensions of Dirac Modes in IR Phase of QCD

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One consequence of the recently developed effective number theory, designed to count objects with probabilities, is that it leads to a well-defined concept of *effective dimension*. Due to the additivity of effective numbers, the latter is a measure-based construct extending the Hausdorff/Minkowski-like notion of dimension for fixed sets (with metric) to the stochastic domain. Both IR (infrared) and UV properties can be characterized in this way. Here we evaluate the IR effective dimension d_{IR} of Dirac modes in the IR phase of thermal QCD. Our results support the existence of a non-trivial structure in deep IR of the spectrum, involving integer dimensions. We point out certain similarities of this structure to one that we simultaneously observe in the vicinity of previously identified Anderson-like mobility edge, located above the energy scale set by temperature.

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