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Fluctuations and hadronic correlation functions from the instanton-dyon ensembles

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Instanton dyons are topological objects generalizing instantons to the case of
nonzero VEV of the Polyakov line. Previous simulations of their ensembles
have reproduced the location and the order of the deconfinement transition in pure gauge theories. They also explain the location and crossover nature of the chiral transition in QCD with dynamical quarks. In the deformed QCD with nonzero
imaginary chemical potentials, called Zn QCD, both the deconfinement and the chiral transition completely change, to strong first order and no transition, respectively.
New studies focus on fluctuations of topological, electric and magnetic charges in sub volumes, as well as on hadronic correlation functions, for mesonic and baryonic local operators. We observe that this theory reproduces well all known vacuum phenomenology
of correlators, at its lowest temperatures, provided there is certain strong correlation
in locations of M-type and L-type dyons.

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