

# Topological structures in finite temperature QCD

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We report our study on the properties of the topological structures present in the QCD medium just above the chiral crossover transition. We use dynamical domain wall fermion configurations on lattices of size  $32^3 \times 8$ , used earlier in [1] to calculate the crossover transition temperature  $T_c$  in QCD, and detect the topological structures through the zero modes of the overlap operator. In particular, their positions and spatial and temporal widths are measured. We explicitly show that the properties of the zero modes of the QCD Dirac operator agrees well with that of calorons with non-trivial holonomy. Different profiles of the zero modes are observed, ranging from solutions that are localized in all four spacetime dimensions, to profiles that are localized in the spatial directions, and constant along the temporal extent of the lattice. This indicates towards the presence of instanton-dyons in the hot QCD medium just above  $T_c$ , where the distance between dyons control the shape and extent of the zero modes.

[1] QCD Phase Transition with Chiral Quarks and Physical Quark Masses  
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