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Field confinement in infrared effective QCD and thermal field dynamics

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Keeping in view the dominance of non-perturbative phenomenas in low energy regime of QCD, an infrared effective dual QCD, based on topologically viable homogeneous fibre bundle approach, has been analysed for exploring the dynamics of confined fields in its dynamically broken phase which has been shown to lead an unique multi-flux tube configuration and a typical glueball spectrum intimately connected to the color confining features of QCD vacuum. In addition, due to the extreme relevance of the QCD studies under varying thermal conditions, the flux-tube picture of dual QCD has further been analysed at finite temperatures for its implications to ultra-RHIC especially for the case of flux tube annihilation and the creation of quark pairs leading to the emergence of QGP in thermalised QCD vacuum. The stability of flux tubes and the associated plasma oscillations at different hadronic scales in full infrared sector of QCD have also been investigated to demonstrate its connection with particle production in the central region in RHIC events.

Primary author: Mr RAWAT, Deependra Singh (Kumaun University, Nainital, India)

Co-authors: Dr YADAV, Dinesh (Kumaun University, Nainital, India.); Prof. CHANDOLA, H.C. (Kumaun University, Nainital, India); Dr PANDEY, H.C. (Birla Institute of Applied Sciences, Bhimtal, India)

Presenter: Mr RAWAT, Deependra Singh (Kumaun University, Nainital, India)

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