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The QCD Critical End Point in the Context of the Polyakov–Nambu–Jona-Lasinio Model

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We investigate the phase diagram of the so-called Polyakov–Nambu–Jona-Lasinio model at finite temperature and nonzero chemical potential. The calculations are performed in the framework of the PNJL Lagrangian in the light and strange quark sector (u,d,s) which includes the 't Hooft instanton induced interaction term that breaks the axial symmetry, and the quarks are coupled to the (spatially constant) temporal background gauge field. Analysing the relevant order-like parameters, possible interrelations between chiral symmetry restoration and deconfinement are discussed.

A special attention is given to the critical end point (CEP): the influence of the strangeness on the location of the CEP is studied; also the strength of the flavor-mixing interaction alters the CEP location, once when it becomes weaker the CEP moves to low temperatures and can even disappear.

On the other hand we also explore the connection between QCD, a nonlocal Nambu–Jona-Lasinio type model and the Landau gauge gluon propagator. Possible links between the quenched gluon propagator and low energy hadronic phenomenology are investigated.

References:

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Primary author: COSTA, Pedro (Physics Department of the University of Coimbra)

Presenter: COSTA, Pedro (Physics Department of the University of Coimbra)