



Contribution ID: 12

Type: **oral presentation**

QCD in Strong Magnetic Fields

Wednesday, 10 July 2013 10:20 (20 minutes)

We study electromagnetic and topological properties of the QCD vacuum and quark-gluon plasma in the background of strong (hadronic scale) magnetic fields comparable to the ones taking place in heavy-ion collisions. Among the properties are the following ones: electric conductivity, magnetization and magnetic susceptibility, local CP-violation and induced anomalous currents, distribution of the topological charge density, chiral symmetry breaking and the chiral condensate. I will mainly present the results obtained within the lattice QCD simulations and, if there is time left, with the use of original analytic methods.

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Session Classification: Heavy ion collisions