Contribution ID: **14** Type: **Talk**

Validity range of canonical approach to finite density QCD

Thursday, 16 July 2015 09:10 (20 minutes)

We calculate the baryon chemical potential (μ) dependence of thermodynamic observables, i.e., pressure, baryon number density and susceptibility by lattice QCD using the canonical approach with winding number expansion.We compare the results with those obtained by the multi parameter reweighting (MPR) method; Both methods give very consistent values in the regions where errors of the MPR are under control.The canonical method gives reliable results up to μ/T=3.

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Session Classification: Nonzero Temperature and Density

Track Classification: Nonzero Temperature and Density