



Contribution ID: 736

Type: Poster

Functional QCD: From Correlators to Thermodynamics

Tuesday 15 May 2018 19:10 (30 minutes)

Functional continuum methods provide ab-initio access to the non-perturbative regime of quantum chromodynamics. In particular, they allow accessing non-zero temperatures and densities, making them an ideal tool to access QCD's phase diagram. The functional QCD collaboration [1] aims to map out the phase diagram in a systematic manner. Within the functional renormalization group (FRG) approach, remarkable progress has been achieved over the last few years.

In this talk I will briefly review results on chiral symmetry breaking and confinement at vanishing and finite temperature [2-5]. A particular challenge within the functional approaches is the extraction of the equation of state from correlation functions. I will report on recent progress and present first results on the trace anomaly as well as the pressure.

References:

- [1] fQCD Collaboration, J. Braun, L. Corell, A. K. Cyrol, W.-J. Fu, M. Leonhardt, M. Mitter, J. M. Pawłowski, M. Pospiech, F. Rennecke, N. Wink
- [2] M. Mitter, J. M. Pawłowski, and N. Strodthoff, arXiv:1411.7978 [hep-ph], Phys. Rev. D91, 054035 (2015)
- [3] A. K. Cyrol, L. Fister, M. Mitter, J. M. Pawłowski, and N. Strodthoff, arXiv:1605.01856 [hep-ph], Phys. Rev. D94, 054005 (2016)
- [4] A. K. Cyrol, M. Mitter, J. M. Pawłowski, and N. Strodthoff, arXiv:1706.06326 [hep-ph]
- [5] A. K. Cyrol, M. Mitter, J. M. Pawłowski, and N. Strodthoff, arXiv:1708.03482 [hep-ph]

Content type

Theory

Collaboration

Centralised submission by Collaboration

Presenter name already specified

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