The QCD Parton-Hadron Phase Boundary

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The Phase Boundary from Statistical Model Analysis

State of the art.
Second order Corrections to SHM

Revisit the hadronic-expansions stage:
UrQMD study of afterburner effects

Modification factors for hadronic Multiplicities
Baryon-Antibaryon annihilation effects
UrQMD plus SHM

- drastic chi$^2$/dof improvement
- T rises above traditional SHM
Data Analysis with UrQMD Modification

Example: Pb+Pb central NA49 at SPS
T increases by 12 MeV
\( \chi^2/dof \) decreases
The result: AGS, SPS, LHC

- low curvature up to \( \mu(B) = 400 \text{MeV} \)
- in agreement with lattice predictions

O. Kaczmarek et al., PRD 83 (2011)
P. Hedge et al., arXiv: 1511.03378
G. Enrodi et al., JHEP 1104 (2011)

Abrupt drop-off beyond \( \mu(B) = 400 \text{MeV} \)
see also A. Andronic et al., Nucl. Phys. A772 (2006)
Tensions concerning $T_c$

- We report $T(c)=163\text{MeV}$, similar to $e^+e^- \rightarrow \text{hadrons}$

- Lattice matching to Hadron Gas (HRG) reports $T(c)=150\text{MeV}$

A. Bazavov et al., PRD 90 (2014)
A. Bazavov et al., PRL 113 (2014)

Open Question!