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## Thermodynamics of heavy-light hadrons

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Ratios of cumulants of conserved net charge fluctuations are sensitive to the degrees of freedom that are carriers of the corresponding quantum numbers in different phases of strong interaction matter. We calculate second and fourth order cumulants of net charm and strange fluctuations and their correlations with other conserved charges such as net baryon number and electric charge.

Simulation are performed on  $N_t=6,8,12$  lattices using the Highly Improved Staggered Quark (HISQ) action with a light to strange quark mass ratio of  $1/20$  and having charm quarks treated in the quenched approximation.

Analyzing appropriate ratios of these cumulants we observe that both open strange and charm hadrons start to get deconfined in the chiral crossover region. We provide evidence for additional, experimentally yet unobserved open charm and strange hadrons from QCD thermodynamics by comparing lattice QCD results to Hadron Resonance Gas model calculations performed with a hadron spectrum as listed in the Particle Data Tables as well as with a spectrum predicted in relativistic quark model and observed in lattice QCD calculations.

We also discuss the influence of these yet unobserved states on the determination of freeze-out temperature and chemical potentials from heavy ion collision experiments.

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