Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Chiral Phase Structure in 2+1 Flavor Soft-Wall AdS/QCD THEO JACOBSON, Macalester Coll — In this work we analyze the structure of the chiral phase transition in a soft-wall model of AdS/QCD. In our previous work we explored a 2-flavor-symmetric model which yielded a second-order transition for massless quarks and crossover transitions for massive quarks. We have extended the model to 2+1 flavors to see the effects of different quark masses on the order of the chiral transition. Using a holographic approach, we investigate the Columbia Plot produced by lattice gauge theory. We obtain independent sources of explicit and spontaneous symmetry breaking, and through black hole thermodynamics explore the effects of high temperature and chemical potential on the chiral condensate. We investigate various values of the light and strange quark masses and find the critical line separating first-order from crossover transitions in the mass plane. In the case of equal quark masses, a mass of 35 MeV separates first-order from crossover transitions. At the physical point we find that the transition is first-order. Our work supplements lattice simulations and other holographic studies that do not sufficiently treat finite baryon density. However, we find that the phase structure is qualitatively independent of chemical potential. Thus, a tri-critical point is absent from our model.

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Date submitted: 31 Jul 2017 Electronic form version 1.4