Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Chiral Phase Transition in Soft-Wall AdS/QCD THEODORE JACOBSON, Macalester College — We investigate the chiral phase transition, which describes the shift from broken to restored chiral symmetry at high temperatures and densities, within a soft-wall model of AdS/QCD. Extending previous work in this approach to strongly-coupled quantum chromodynamics, we obtain independent sources of explicit and spontaneous symmetry breaking at finite baryon chemical potential. Using black hole thermodynamics, we explore the effects of temperature and chemical potential on the chiral condensate, in the case of zero and finite quark mass. In the chiral limit, the transition is second-order, with a critical temperature of 155 MeV and critical density of 566 MeV, consistent with lattice calculations. For a physical value of the light quark mass, the transition is a rapid crossover, with a pseudo-transition temperature and density of 151 MeV and 559 MeV, respectively. The mass-splitting between the vector and axial-vector mesons indicates clear chiral symmetry breaking, and is expected to vanish as chiral symmetry is restored. Quantitative analysis of the mass spectra as temperature and density increase reveals that the meson bound states melt before the chiral phase transition occurs.

Theodore Jacobson
Macalester College

Date submitted: 18 Jul 2016 Electronic form version 1.4