



Contribution ID: 428

Type: **Talk**

## The QCD Phase Transition with Three Physical-Mass Pions

*Thursday, 26 June 2014 16:15 (20 minutes)*

On behalf of the HotQCD collaboration, I present results from the first lattice study of the QCD phase transition using chiral fermions and physical quark masses. With domain wall fermions, the dislocation suppressing determinant ratio (DSDR), a temporal Euclidean extent of 8 sites, and spatial extents of at least 4 and up to 11 fm, we have computed the disconnected chiral susceptibility for several temperatures between 130 and 200 MeV and found a pronounced peak, the position and height of which depend sensitively on the quark mass. We find no metastability in the peak region and no significant change in the peak height upon increasing the spatial extent from 5 to 10 fm, strong evidences that the transition is an analytic crossover. We derive a pseudo-critical temperature of 155(1)(8) MeV and find that while chiral symmetry is fully restored above 164 MeV, anomalous  $U(1)_A$  symmetry breaking is substantial until roughly 196 MeV. In addition, I present preliminary results for our latest calculation with a temporal extent of 12 sites, aimed at quantifying finite lattice spacing effects.

**Primary author:** Dr SCHROEDER, Chris (LLNL)

**Presenter:** Dr SCHROEDER, Chris (LLNL)

**Session Classification:** Nonzero temperature and Density

**Track Classification:** Nonzero Temperature and Density