Department of Theoretical Physics

Free Meson Seminar

Speaker	:	Hiroaki Kohyama (Academia Sinica, Taiwan)
Topic	:	The Nambu Jona-Lasinio model with density dependent UA(1) anomaly
Day, Date & Time	:	Thursday, January 28, 2010 at 2:30 p.m.
Place	:	AG 69

Abstract

Whether the phase transition from chiral broken phase to chiral restored state is of the first order is an interesting question. To study this, we use the Nambu Jona-Lasinio model which is believed to be a low energy effective theory of quantum chromodynamics (QCD). In this work, we consider the density dependent UA(1) anomaly and study the critical surface in the quark mass and chemical potential space. We have found that the surface shrinks when a quark chemical potential increases, which is the opposite result from the study by using usual NJL model. The difference comes from the density dependence of the UA(1) anomaly and our result is consistent to the recent lattice QCD study. Our result suggest the restoration of the UA(1) anomaly at high density, which seems to be physically reasonable because a colour superconductivity state may dominate at intermediate baryon density where the UA(1) anomaly should be negligible.

(Nilmani Mathur)