

Department of Theoretical Physics

Special Free Meson Seminar

<i>Speaker</i>	:	Jyotirmoy Maiti (SINP, Kolkata)
<i>Topic</i>	:	Scale Determination in Lattice QCD with Dynamical Fermions
<i>Day, Date & Time</i>	:	Monday August 11, 2008 at 4:00 p.m.
<i>Place</i>	:	Theoretical Physics Seminar Room (A304)

Abstract

Dependence of a/r_c (inverse Sommer parameter in units of lattice spacing “a”) on am_q (quark mass in lattice unit) has been observed in all lattice QCD simulations with sea quarks including the ones with improved actions. How much of this dependence is a scaling violation has remained an intriguing question. Our approach has been to investigate the issue with an action with known lattice artifacts, i.e., the standard Wilson quark and gauge action with $\beta=5.6$ and 2 degenerate flavors of sea quarks on $16^3 \times 32$ lattices. In order to study in detail the sea quark mass dependence, measurements are carried out at eight values of the PCAC quark mass am_q . Though scaling violations may indeed be present for relatively large am_q , a consistent scenario at sufficiently small am_q seems to emerge in the mass-independent scheme where for a fixed β , $1/r_0$ and $\sqrt{\sigma}$ have linear dependence on m_q as physical effects similar to the quark mass dependence of the rho mass. We present evidence for this scenario and accordingly extract the lattice scale “a” by chiral extrapolation to the physical point.

(Saumen Datta)