



# Physical Research Laboratory, Ahmedabad

## COLLOQUIUM - 14 - 13

- Speaker:** Prof. Rajiv V. Gvai  
Chairperson & Senior Professor of Theoretical Physics at TIFR, Mumbai.
- Title:** "QCD Critical Point : A Synergy between Theory and Experiment"
- Time:** Wednesday, 15 October, 2014, 16.00 hrs.
- Venue:** Seminar Hall, Above NANOSIMS Laboratory, PRL.

### Abstract

Quantum Chromo Dynamics (QCD), the theory of strong interactions, has a large coupling between its constituents quarks and gluons, necessitating new theoretical tools. QCD on a space-time lattice is the most reliable such tool available to us. One can employ it to look for new phases of strongly interacting matter at high temperatures and densities, and investigate their properties. QCD phase diagram has been a subject of intense discussions. QCD critical point has recently attracted a lot of theoretical, and now experimental, attention and lattice QCD results will be discussed. We argue that the freeze-out curve in the QCD phase diagram, which embodies a substantial amount of precise experimental data in heavy ion collisions, can be used in conjunction with lattice QCD to search for the critical point at RHIC, BNL, New York and other upcoming facilities. While the variance, skewness and kurtosis of baryon number distribution are smooth & monotonic along it at RHIC and LHC energies, the beam energy scan at RHIC should see deviations, signalling the presence of a nearby critical point. Its experimental discovery will be a profound and unique landmark in physics.

### The Speaker

Prof. Rajiv V. Gvai earned his B.Sc. and M.Sc. degrees from Nagpur University and IIT Mumbai respectively. He obtained his Ph. D. degree from the Mumbai University in 1981. Subsequently he went to Germany as an Alexander von Humboldt Fellow to work with Prof. H. Satz of University of Bielefeld in the area of quantum field theory on space-time lattices. He stayed on as a visiting professor in the Interdisciplinary Center for Research in Bielefeld up to 1984, and moved subsequently to Brookhaven National Laboratory, New York as a research associate. He came back to India in 1986 and joined the Tata Institute of Fundamental Research, where he is currently a Senior Professor & Chair of the Theoretical Physics department. Prof. Gvai has distinguished himself both internationally and nationally as a leader in the field of lattice quantum chromo dynamics (QCD) and quark-gluon plasma (QGP), which is a unique and important prediction of the standard model of particle interactions. He has authored over 170 research articles, edited books, and has been on the editorial board of Pramana - the Indian Journal of Physics as well as Nuclear Physics A of Europe. Prof. Gvai was one of the driving forces to get email connectivity to all academic institutions in India via the VIDYANET proposal in 1986 which was incorporated in the ERNET implementation. Prof. Gvai is a Fellow of the Indian National Science Academy, New Delhi and the Indian Academy of Science, Bangalore. He is also a Sir J. C. Bose National Fellow of the Govt. of India.

Tea at 15:30 hrs.

ALL ARE WELCOME

