

Understanding the Glue that Binds Us All: The next QCD Frontier---The Science of The Electron Ion Collider

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1:30 – 2:30 PM

Venue: OE 134, MMC

Abstract: Despite many decades of experimentation and theoretical progress in QCD, we are still far from understanding the precise role gluons (and sea quarks) play in imparting the properties to nucleons and nuclei. We now realize that many of them are emergent properties resulting from the partons' collective behavior. Over the past decade, theorists have developed sophisticated tools and formalisms to view and understand the nucleons and nuclei in terms of that collective interactions of partons. A high energy high luminosity polarized electron ion collider coupled with appropriately designed detector systems would allow us to study the gluons and sea quarks within the framework of those new theoretical tools. Technology to achieve the desired design parameters of such a collider seems to be on the horizon. Motivated by the anticipated readiness of all three: theory, accelerator and detector capabilities, in the next few years, the US Nuclear Science Advisory Committee (NSAC) recommended in 2015 that an electron ion collider (EIC) be built. I will review the compelling open questions in QCD that will be addressed by the EIC, and give a brief overview of where we stand on it in terms of the project (accelerator and detector designs) and collaboration building.



Biography: **Abhay Deshpande** is a Professor in the department of Physics and Astronomy at Stony Brook University (SUNY). He also serves as Senior Fellow and Deputy Group Leader for Experiments at the RIKEN BNL Research Center. Abhay received his Ph.D. from Yale University in experimental particle physics in 1995. After spending three years at CERN and a year at DESY as a Yale Fellow, he became RIKEN Fellow at the RIKEN BNL Research Center. He moved to Stony Brook University in 2004 where he has been since. Abhay started his research career searching for some of the ultra rare decays of the Kaon for his doctoral thesis. Since then his activities have focused on understanding QCD by probing the momentum and spin structure of the proton in terms of its fundamental components (quarks and gluons) and their dynamics and to a lesser degree collisions of light and heavy nuclei. Abhay has been deeply involved and promoted the Electron Ion Collider and its science since he was a postdoctoral fellow and was recently elected Chair of the Steering Committee (first Spokesperson) of the EIC Users Group. He has 350+ peer reviewed publications to his credit. Abhay is a life member of the APS* and AAAS**. He is an APS Fellow and an Education Fellow for Life Sciences of the Summer Institute (National Academy Sciences) for developing interdisciplinary course material for teaching introductory physics and biology. Abhay is currently a member of NSAC. He recently chaired and hosted the annual meeting of the APS's Undergraduate Women in Science for the (US) North East Corridor.

The event is free and open to the public.

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