



Indian Institute of Technology Kanpur



INSTITUTE LECTURE SERIES

February 12, 2024 (Monday) | 5 pm | L - 17

Talk Title: Understanding the gluon - the "super-god particle" - that binds us all
Subtitle: The Science of the future Electron Ion Collider (EIC)

Speaker: Professor Abhay Deshpande

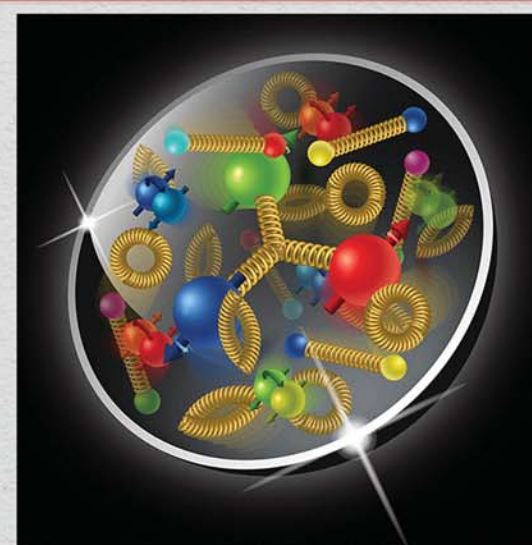
About the Speaker



Abhay Deshpande, a Distinguished Professor at Stony Brook University, State University of New York (SUNY), and Director of Science for the Electron Ion Collider (EIC) at Brookhaven National Laboratory, is a leading figure in nuclear and particle physics. Graduating from IIT Kanpur in 1987 and earning his Ph.D. from Yale University in 1994, he conducted research at renowned institutions such as CERN (Geneva, Switzerland) and DESY (Hamburg, Germany) before becoming a Fellow at the RIKEN BNL Research Center. His expertise lies in studying the quark-gluon structure within protons and nuclei to comprehend Quantum Chromodynamics (QCD) and exploring the limits of the Standard Model through precision electroweak probes. As a pioneer in advocating for the Electron Ion Collider, Abhay has played a crucial role in shaping nuclear physics. Beyond research, he holds key leadership roles, including Founding Director of the Center for Frontiers in Nuclear Science. Acknowledged for his contributions, he received prestigious awards like the SUNY Chancellor's Award (2018) and IIT Kanpur's Distinguished Alumnus Award (2021), with his induction into NY State's Distinguished Academy in 2022. A life member of American Physical Society (APS) and American Association of Advancement of Science (AAAS), Abhay actively engages with the scientific community through advisory roles, solidifying his impactful presence in the field.

Abstract of the Talk

Protons and neutrons are the building blocks the observable universe. However, despite much experimental and theoretical effort over the past century we know surprisingly little about the origin of their intrinsic properties. For example, how do the quarks and gluons, discovered in the 1960's, interact amongst themselves to constitute the "spin" of the proton? How exactly does the proton's mass emerge from those interactions? We don't fully know yet. Further, current understanding of quark-gluon interactions in Quantum Chromodynamics (QCD) — the Standard Model of Strong Interactions — leads to a prediction of a novel state of (saturated) gluonic matter. However its experimental evidence remains elusive. To solve these and other such puzzles in QCD a new collider is being built. In this talk, the speaker will introduce some selected science drivers of the EIC and introduce and talk about how it might address the above fundamental questions.



All are cordially invited to attend
Office of Dean Research & Development