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The 172nd HENPIC seminar by Dr. Jianwei Qiu (邱建伟)

Title: Nuclear Femtography - QCD and hadron physics at a Fermi scale

Abstract: The proton and neutron, collectively called nucleons, are the fundamental building blocks of all atomic nuclei that make up essentially all the visible matter in the universe. More than 50 years of study has revealed that nucleons are composed of elementary particles called quarks and gluons, whose interactions and dynamics are governed by Quantum Chromodynamics (QCD). However, many profound questions remain, such as how did nucleons and their properties be emerged from quarks and gluons? what is the internal structure of nucleons? how does the glue bind us all? Developing a deeper understanding of these building blocks of the visible matter is one of the grand challenges of modern science. In this talk, I will introduce the Nuclear Femtography, as a new frontier of Science and Technology, and explain how it will help us to search for answers to the most compelling unanswered questions about the elementary building blocks of our visible world. I will also demonstrate how a high energy and high luminosity lepton-hadron facility could be capable of exploring the inner structure of nucleons and nuclei with sub-femtometer resolution, and could be the best facility for studying Nuclear Femtography, dealing with emerging phenomena of QCD at a Fermi scale, which is the most interesting, rich, and complex regime of the strong interacting theory!

About the speaker: Jianwei Qiu is currently the Associate Director for Theoretical & Computational Physics and the director for Theory Center at Jefferson Lab. He received his Ph.D. in theoretical physics in 1987 from Columbia Univ., and was a postdoc at ANL and at Stony Brook Univ.. In 1991, Qiu joined Iowa State University. He moved to BNL/Stony Brook Univ. in 2010. His research focus is in QCD and its applications in high-energy particle and nuclear physics.

Summary