

Department of Physics and Materials Science



SEMINAR

Unraveling the Proton: Experimental Insights into Nucleon Structure

Prof. Kei Nagai

University of Memphis

Abstract: The proton, the simplest particle bound by the strong force, still holds many mysteries. It consists of fundamental particles—quarks, antiquarks, and gluons—yet it remains challenging to fully quantify how they are distributed within the proton. Traditionally, momentum distributions of these particles, known as parton distribution functions, have been extensively measured in several experiments, successfully describing certain aspects of proton behavior. However, these one-dimensional functions provide an incomplete view of the proton's internal dynamics. To address this, multidimensional structure functions have become essential in recent studies, offering a more comprehensive understanding. This effort will lead to a deeper understanding of quantum chromodynamics, the theory of the strong force, which will help resolve several unsolved problems in nuclear physics.

In this seminar, I will first introduce the basics of fundamental physics in the context of nuclear physics and nucleon structure. I will then highlight the experimental efforts to unravel it, with a focus on experiments performed at Fermilab.

Bio: Dr. Nagai received his Doctor of Science in fundamental physics from the Tokyo Institute of Technology in 2017. He has held postdoctoral positions at Academia Sinica in Taiwan and Los Alamos National Laboratory, and later worked as a Research Scientist at Duke University. In 2024, he joined the University of Memphis as an Assistant Professor in the Department of Physics and Materials Science. His research focuses on nuclear physics, particularly the structure of nucleons.

YOU ARE INVITED!

Friday Sep.20th, 3 - 4 PM Manning Hall 201



Driven by doing.