

Fall 2022 Colloquium

Department of Physics & Astronomy

Texas A&M University-Commerce

Oct 20, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Nuclear Physics

Nuclear reactions in effective field theory

Dr. Gautam Rupak

Mississippi State University



Dr. Rupak earned his BA degree in Physics and Mathematics from Boston University (1995). He obtained a M.Sc. (1996) and Ph.D. (2000) in Physics from the University of Washington, Seattle. His Ph.D. research was in nuclear effective field theory and its application. Dr. Rupak held postdoctoral positions at TRIUMF (2000-2001), Lawrence Berkeley National Lab. (2001-2003) and Los Alamos National Lab. (2003-2005). Dr. Rupak was a Research Assistant Professor at North Carolina State University, prior to joining Mississippi State University in 2008 as an Assistant Professor where he currently serves as a full Professor. More information about Dr. Rupak and his research can be found at

<https://www.physics.msstate.edu/about/faculty-staff/faculty/gautam-rupak>

Abstract

Effective field theory (EFT) is an indispensable tool in many areas of physics research. Direct calculations from a fundamental theory, even if it is known, can be difficult or even impossible in many situations. EFT is a framework to make simplifying approximations of the fundamental theory that can be systematically improved as required. I demonstrate the general principles of EFT through several applications in nuclear reaction calculations. Radiative capture involving halo nuclei is presented. Bayesian model selection is used to rank competing theories. Calculations in an EFT defined on a space-time lattice would also be discussed. Some recent work on reaction calculations on a quantum computer will be presented.