Rishi Babu – HEP Seminar – September 2, 2025
MSU

Title: Understanding the Enigmatic Particle Accelerators in the Universe with the Multimessenger observations

Abstract:

One of the greatest unsolved puzzles in particle astrophysics and a key to understand how our universe operates, is the origin of ultra high-energy cosmic rays, high energy neutrinos, and high energy gamma rays. Over the past several decades, gamma-ray and neutrino observatories have revealed the presence of extremely energetic particles originating from a wide range of astrophysical environments, including pulsars, blazars, and potentially even the vicinity of black holes. These discoveries have opened the door to the field of multimessenger astrophysics, where the combined observation of different messengers provides deeper insights in probing the particle acceleration mechanism, than any single observation alone. In this talk, I will explore how multimessenger observations of neutrinos and gamma-rays can shed light on the underlying physical phenomena occurring within these sources, and help is identify their role in accelerating the cosmic rays within our galaxy .