Society of Physics Students presents:

PHYSICS ALUMNI SERIES SEMINAR

The Search for Ultra-High Energy Neutrinos at the South Pole Using the Askaryan Radio Array

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Multimessenger astronomy seeks to probe the deepest reaches of our universe using photons, cosmic rays, gravitational waves, and neutrinos. Neutrinos are virtually massless and only interact via the weak force, meaning they are capable of traveling directly from their sources to detectors built on Earth. This ability to travel in a straight line through the universe makes them prime candidates for probing extragalactic sources. The Askaryan Radio Array (ARA) is an ultra-high energy (>10^18 eV) neutrino detector located at the South Pole, whose goal is to study particle physics at energies far beyond the capabilities of particle accelerators on Earth. It consists of five stations of antennas buried in the ice that are designed to detect radiation emitted by relativistic particle showers that are byproducts of neutrino interactions in the ice, which generate a cone of Cherenkov radiation in the radio regime (known as Askaryan radiation). The neutrino direction can be reconstructed through a combination of the trajectory of the Askaryan radiation, its polarization, and the point of the neutrino interaction in the ice; which can then be used to identify neutrino sources in the sky. Detection of these ultra-high energy neutrinos and identification of their sources will allow us to expand our knowledge of the standard model of particle physics.

Tuesday April 23rd, 2024

11:30 am in SR 151

Pizza and Refreshments Provided