Detecting Cosmic Neutrinos with IceCube at the Earth’s South Pole

Prof. Naoko Kurahashi Neilson – Drexel University

Abstract: The universe has been studied using light since the dawn of astronomy, when starlight captured the human eye. The IceCube Neutrino Observatory views the universe in a different and unique way; in high-energy neutrinos. IceCube’s discovery of a diffuse flux of astrophysical neutrinos, the universe’s glow in neutrinos from beyond the solar system, started a new era of neutrino astronomy. I will motivate why neutrinos are a necessary messenger in high-energy astronomy. I will discuss the multiple diffuse flux analyses in IceCube that observe the astrophysical flux, and what each can tell us. Spatial analyses that aim to identify the sources of such astrophysical neutrinos will also be discussed, followed by an attempt to reconcile all results to draw a coherent picture that is the state of neutrino astronomy.