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Search for astrophysical neutrinos with IceCube

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The IceCube Neutrino Observatory, located at the geographic South Pole, utilizes 1 km³ of the glacial ice and is the world's largest detector for high-energy neutrinos. IceCube searches for high-energy astrophysical neutrinos whose observation will provide a complementary view of some of the highest energy phenomena occurring in the known universe. High energy neutrinos have been predicted to be produced in astrophysical sources such as active galactic nuclei and gamma ray bursts, where cosmic rays are supposed to be accelerated to very high energies. IceCube detects the optical light emitted by the charged particles produced when neutrinos interact in the ice. When a neutrino interacts, it can transfer its energy to a single long-range particle or it can initiate a shower of many particles resulting in a localized deposition of energy and a bright nearly point-like source of light. These two possibilities lead to two rather different event signatures in IceCube. In this talk I will introduce my research which focuses on the second option looking for the point-like sources of light from the neutrino-induced showers of particles.

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