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Astrophysical Neutrinos with the IceCube Detector

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The IceCube Neutrino Observatory at the South Pole has powerful capabilities to explore the universe. Two of its primary goals are to observe cosmic neutrinos with TeV energies and above, and to find astrophysical sources of ultra high energy cosmic rays. IceCube is comprised of a cubic kilometer of glacial ice instrumented with 86 vertical strings, each with 60 optical sensors deployed at depths between 1450 and 2450 meters, and a square kilometer array at the surface. The sensors detect Cherenkov radiation from charged particles produced in all flavors of neutrino interactions in the ice. This talk will focus on the latest IceCube results from searches for high energy astrophysical neutrinos, including the first detection of PeV neutrinos, the highest energy neutrinos detected to date. Evidence will be presented that IceCube has observed, for the first time, a diffuse neutrino flux consistent with an astrophysical origin. This will be followed by an outlook and plans to extend the detector capabilities at highest energies.

Summary

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