

{talks} //

Active Galactic Nuclei (AGNs)



**Jim Madsen //**

Wisconsin IceCube Particle Astrophysics Center (WIPAC)

**Session 5 //**

Thursday, 7 September @ 08:45 SAST

The IceCube Neutrino Observatory, running in its present configuration since 2011, has realized the dream of capturing neutrinos to explore the high energy universe. A cubic kilometer of South Pole ice at depths between 1.5 and 2.5 kilometers has been transformed into a versatile instrument capable of seeing neutrinos with energies spanning more than 10 orders of magnitude. The annual data set includes roughly  $10^{11}$  cosmic ray events,  $10^5$  neutrinos created by cosmic ray interactions in the Earth's atmosphere, and hundreds of neutrinos from astrophysical sources. The search for origins of astrophysical neutrinos is challenging both because of the low number of neutrinos that interact and the large background signal. Improvements in event selection and reconstruction have enabled the first steady-state high energy neutrino sources to be identified---NGC1068 and the Milky Way Galaxy. An overview of these recent results together with a survey of the IceCube science scope will be provided along with a summary of the low-energy extension IceCube Upgrade underway, and of IceCube-Gen2, a high energy extension in the planning stage.

NAME OF COLLABORATION

**IceCube**