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High energy neutrinos from the cold : status and prospects for the IceCube experiment

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The observation of high energy neutrinos from cosmic objects is expected to bring us key information about the most energetic processes known in the universe, such as gamma ray bursts and events in the surroundings of supermassive black holes. Their observation could also help us to understand the mechanism for cosmic ray acceleration, a long-standing puzzle. High energy neutrinos may also elucidate the nature of the dark matter, via the observation of WIMPs annihilation into neutrinos. In recent years, several projects aiming at the observation of high energy neutrinos have been developed. The most ambitious, and most advanced of these is the IceCube Neutrino Observatory, currently under construction at the geographic South Pole. When completed in 2011, IceCube will consist of an instrumented ice volume of about one cubic kilometer, together with a surface air shower array of matching dimensions. Twenty two out of the eighty foreseen strings are already taking data and the first physics analyses using IceCube data are being developed within the collaboration. 18 strings deployed during this austral summer are under commissioning, bringing the detector to half of its final size. An overview of the motivations of high energy neutrino astronomy will be given, with special emphasis on expectations for IceCube. We will also present the status of the experiment and some recent results obtained with the 9-strings detector that was running in 2006.

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