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Observation of high energy neutrinos with IceCube

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High energy cosmic rays have been observed up to extremely high energies of more than 10^{20} eV. The mechanism of their acceleration and their sources are, however, still largely unknown. Numerous scenarios suggest that neutrinos are produced in collisions of cosmic rays with matter or radiation fields in the source region. Because neutrinos are neither absorbed nor deflected, they will point directly back to their sources making them a unique tool for high energy particle astronomy. The IceCube neutrino detector at the South Pole, in full operation since 2011, uses more than a billion tons of natural ice as a target for neutrino detection. More than 50,000 atmospheric neutrinos at the TeV energy scale are being detected per year. The first several years of data have provided compelling evidence for a flux of neutrinos of astrophysical origin. The data include the detection of tens of neutrinos per year with energies above 10^{14} eV - the highest energy leptons ever observed. The data are consistent with expectations from an extragalactic neutrino flux, however a galactic contribution cannot be excluded with current data. I will review the recent findings obtained with IceCube and compare data with expectations. New strategies such as multimessenger approaches where data from IceCube are correlated with observations of gamma rays and other telescope data will be discussed.