

Astronomy and particle physics with IceCube at the South Pole

*Prof. Dr. Klaus Helbing
Bergische Universität Wuppertal*

IceCube has been completed in December 2010. It forms a lattice of 5160 photomultiplier tubes monitoring a gigaton of the deep Antarctic ice for particle induced photons. The telescope is primarily designed to detect neutrinos with energies greater than 100 GeV from astrophysical sources.

Besides this astrophysical motivation IceCube is also a discovery instrument for the search for physics beyond the standard model. Owing to low ice temperatures, the photomultiplier dark noise rates are particularly low which open up tantalizing possibilities for particle detection. This includes the indirect detection of weakly interacting dark matter, direct detection of SUSY particles produced in very high energy interactions, monopoles and strangelets. Also the sensitivity to neutrino properties and Lorentz invariance is considered.