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A radio air shower detector as an extension for IceCube and IceTop

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Abstract content

The IceCube neutrino detector is built into the Antarctic ice sheet at the South Pole to measure high energy neutrinos. For this, 4800 PMTs are being deployed at depths between 1,450 and 2,450 meters into the ice to measure neutrino induced charged particles like muons. IceTop is a surface air shower detector consisting of 160 Cherenkov ice tanks located on top of IceCube. To extend IceTop, a radio air shower detector could be built to increase the sensitivity at higher shower energies and for inclined showers significantly. As air showers induced by cosmic rays are a major part of the muonic background in IceCube, IceTop is not only an air shower detector, but also a veto to reduce the background of IceCube. Air showers are detectable by radio signals with a radio surface detector. The major emission process is the coherent synchrotron radiation (geosynchrotron effect), emitted by e^+ e^- shower particles in the Earths magnetic field. Simulations of the expected radio signals of air showers are shown. The efficiency and the energy threshold of antenna field configurations are estimated.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 917-920

Primary author(s) : Dr. KARG, Timo (Bergische Universität Wuppertal)

Co-author(s) : Mr. AUFFENBERG, Jan (Bergische Universität Wuppertal); Prof. GAISSER, Tom (University of Delaware); Prof. HELBING, Klaus (Bergische Universität Wuppertal); Prof. KARLE, Albrecht (University of Wisconsin)

Presenter(s) : Dr. KARG, Timo (Bergische Universität Wuppertal)

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