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Atmospheric Muon and Neutrinos in IceCube Neutrinos Observatory RYAN BIRDSALL, University of Wisconsin-Madison — The goal of the IceCube Neutrino Telescope is to detect high-energy neutrinos of extraterrestrial origins. The flux of neutrinos produced by the impact of cosmic rays in the Earth's atmosphere constitutes an irreducible foreground among which cosmic neutrinos are searched. Therefore the detailed measurement and knowledge of the atmospheric neutrinos is fundamental. Extensive air showers initiated by high energy cosmic ray particles have been simulated using CORSIKA generator, with Hoerandel polygonato model of cosmic ray spectrum and composition, and with three different high energy interaction models: QGSJET01, QGSJET-II, AND SIBYLL. With these models, the "conventional" muon and neutrino fluxes, i.e. from the decay of pions and kaons in the atmosphere, have been generated. The resulting muon bundle energy spectrum and mu+/mu- ratio as a function of energy, is compared with various experimental results, such as MINOS, L3Cosmic, and other underground detectors, and with various mathematical calculations. Since muons and neutrinos are produced by the same physical processes, these direct comparisons are used to assess the dependency of neutrino flux on the different interaction models at energies above 1 TeV, i.e. relevant for IceCube. The production of mesons with charm quark is also discussed, since neutrinos produced by the decay of such mesons have harder spectrum than conventional neutrinos, and might mimic high energy extraterrestrial neutrinos in km^3 neutrino telescopes.

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