Contribution ID : **117** Type : **parallel talk**

Constraints on atmospheric charmed-meson production from IceCube

Thursday, 2 June 2016 17:15 (0:20)

Collaboration

IceCube

Abstract content

IceCube's detection of ultra-high energy neutrino events heralds the beginning of neutrino astronomy. At very-high energies (100 TeV - 1 PeV), the dominant background to the astrophysical signal is the flux of prompt neutrinos, coming from the semi-leptonic decay of charmed mesons produced by cosmic ray collisions in the atmosphere. This is due to the very short lifetime of the charmed mesons, which therefore almost always decay before interacting. The small value of Bjorken-x at which the parton distribution functions are evaluated makes the calculation of this process very difficult. The charm quark has mass significantly above the ΛQCD scale, and therefore its production should be perturbatively calculable. However, the uncertainty in the data and the calculations can't exclude some smaller non-perturbative inset. In this talk, the constraints on charm contribution from IceCube studies of atmospheric muons and ultra-high energy neutrinos will be discussed. To evaluate the prompt neutrino flux, one needs the knowledge of the charm production cross section in $pN \to c\bar{c}X$, and hadronization of charm particles. The recent LHC data on charm production will be reviewed and approaches of the calculation of the prompt lepton flux will be discussed.

Primary author(s) : PALCZEWSKI, Tomasz (University of California and LBNL)

Presenter(s) : PALCZEWSKI, Tomasz (University of California and LBNL)

Session Classification : Parallel Session B2