

Abstract Submitted  
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**Muons with High Transverse Momentum in IceCube** LISA GERHARDT, Lawrence Berkeley National Laboratory, ICECUBE COLLABORATION — Muons with a large transverse momentum ( $p_T$ ) are produced in cosmic ray air showers via semileptonic decays of heavy quarks and the decay of high  $p_T$  kaons and pions. These high  $p_T$  muons will have a large lateral separation from the shower core. IceCube, a neutrino telescope consisting of a three-dimensional array of photodetectors buried in the ice of the South Pole and a surface air shower array, is well suited for the detection of high  $p_T$  muons. The surface shower array can determine the energy, location and direction of the cosmic ray air shower while the in-ice array can do the same for the high  $p_T$  muon. This makes it possible to measure the decoherence function (lateral separation spectrum) at distances greater than  $\sim 150$  meters. The muon  $p_T$  can be determined from the muon energy (measured by  $dE/dx$ ) and the lateral separation. The high  $p_T$  muon spectrum may be calculated in a perturbative QCD framework; this spectrum is sensitive to the cosmic-ray composition.

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