
Single unaccompanied hadrons in Milagro and surviving primary cosmic ray protons

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Abstract

A study of single hadrons in Milagro, not accompanied by an air shower over Milagro detector area, will be presented. These events are selected by requiring that greater than 90 percent of the tubes hit in the air shower layer of Milagro are due to scattered Cherenkov light from the cascade produced by the energetic hadron. Milagro is a very large calorimeter, 2000 square meters in area and a depth of 7 interaction lengths and 16 radiation lengths of water. The energy of the hadron is estimated from the sum pulse height in both photo-multiplier layers of Milagro and GEANT simulations of Milagro response to single hadrons. The measured flux of single unaccompanied hadrons can be used to estimate the flux of surviving protons, and in turn to estimate the flux and energy spectrum of primary cosmic ray protons.