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Pion/Muon Identification in a Nuclear Emulsion Cloud Chamber Using Neural Networks

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Abstract : The main part of this work focuses on the study of pion/muon separation at low energy using a nuclear Emulsion Cloud Chamber (ECC) made of lead and nuclear emulsion films. The work consists of two parts: particle reconstruction algorithm and a Neural Network that assigns to each reconstructed particle the probability to be a muon or a pion. The pion/muon separation algorithm has been optimized by using a detailed Monte Carlo simulation of the ECC and tested on real data. The algorithm allows to achieve a 60% muon identification efficiency with a pion misidentification smaller than 3%.

Keywords : nuclear emulsion, particle identification, tracking, neural network
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