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Comparisson between a muon and a high energy tau particle as seen on IceCube detector array

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We present a study of the possible traits that can help to determine the difference between a muon and a high energy tau article regarding their in-ice energy losses. The study consists on muons and tau particles simulated on the atmosphere with an array of different energies ranging from 1 TeV to 1 EeV, and propagated in air and in-ice using PROPOSAL (Monte-Carlo lepton propagator), we keep track of the catastrophic energy losses caused by the ionization, pair production, photonuclear interaction and bremsstrahlung. This gives us information about the behavior of the tracks of energy losses for both types of particles. There are differences in the fluctuations of energy losses, for tau particles there will be more fluctuations of dE/dx and this will be a start point for a future algorithm that classifies the tracks according to the particle type.

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