Monte Carlo Simulation of Pion Particles

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Abstract : Attempts to verify Geant4 hadronic physic to transport antiproton beam using standard physics list have not reach to a reasonable results because of lack of reliable cross section data or non reliable model to predict the final states of annihilated particles. Since most of the antiproton annihilation energy is carried away by recoiling nuclear fragments which are result of pions interactions with surrounding nucleons, it should be investigated if the toolkit verified for pions. Geant4 version 9.4.6.p01 was used. Dose calculation was done using 700 MeV pions hitting a water tank applying standards physic lists. We conclude Geant4 standard physics lists to predict the depth dose of Pion minus beam is not same for all investigated models. Since the nuclear fragments will deposit their energy in a small distance, they are the most important source of dose deposition in the annihilation vertex of antiproton beams.