World Academy of Science, Engineering and Technology
International Journal of Physical and Mathematical Sciences
Vol:8, No:11, 2014

# How Geant4 Hadronic Models Handle Tracking of Pion Particles Resulting from Antiproton Annihilation

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**Abstract :** From 2003, AD4/ACE experiment in CERN tried to investigate different aspects of antiproton as a new modality in particle therapy. Because of lack of reliable absolute dose measurements attempts to find out the radiobiological characteristics of antiproton have not reached to a reasonable result yet. From the other side, application of Geant4 in medical approaches is increased followed by Geant4-DNA project which focuses on using this code to predict radiation effects in the cellular scale. This way we can exploit Geant4-DNA results for antiproton. Unfortunately, previous studies showed there are serious problem in simulating an antiproton beam using Geant4. Since most of the problem was in the Bragg peak region which antiproton annihilates there, in this work we tried to understand if the problem came from the way in which Geant4 handles annihilation products especially pion particles. This way, we can predict the source of the dose discrepancies between Geant4 simulations and dose measurements done in CERN.

**Keywords :** Geant4, antiproton, annihilation, pion plus, pion minus
**Conference Title :** ICHP 2014 : International Conference on Hadron Physics
**Conference Location :** London, United Kingdom
**Conference Dates :** November 28-29, 2014