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Test of Hadronic Models in GEANT4 using the BESIII Data

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The BESIII detector is a conventional solenoidal magnetic spectrometer and operating at the upgraded Beijing Electron-Positron Collider (BEPCII). Since the start of commissioning run in Aug. 2008, about 100M $\psi(2S)$ data and 200M J/ψ data have been collected with BESIII detector.

Using 10M $\psi(2S)$ data taken in 2008, we compare hadronic shower energy, profile and fake photons in the electromagnetic calorimeter with several hadronic models in GEANT4. We find that for pions and protons at low energy (<0.7 GeV) the Bertini model with high precision neutron tracking (QGSP_BERT_HP) is the best among the hadronic models compared, though it takes more simulation time. For anti-proton, the elastic cross section seems to be suppressed and needs to be improved.

We also try to replace GHEISHA by CHIPS model in QGSP_BERT_HP for anti-proton inelastic, marked with CHIPS+HP. Although the comparison result of CHIPS+HP is slightly better than other models, it is also not reasonable.

Are you a Memeber of the Geant4 Collaboration (yes/no)

No

Primary author: Dr CAO, Guofu (Institute of High Energy Physics)

Co-author: Prof. LIU, Huaimin (Institute of High Energy Physics)

Presenters: Dr CAO, Guofu (Institute of High Energy Physics); Prof. LIU, Huaimin (Institute of High Energy Physics)

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