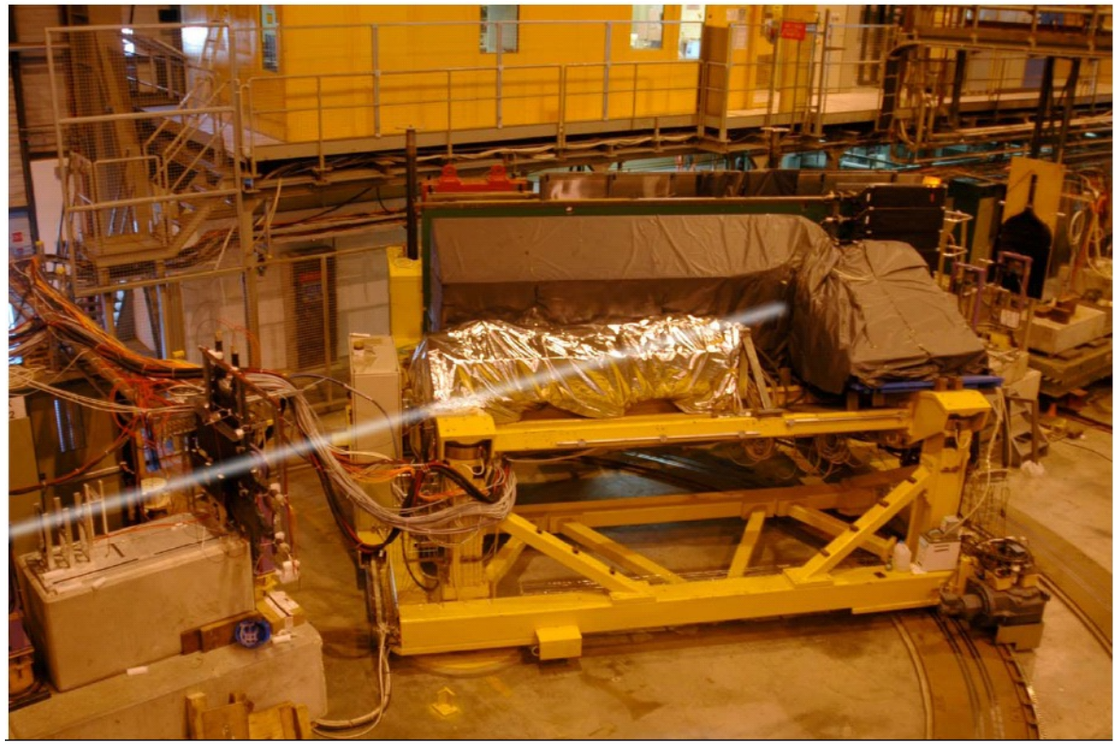
Validation of Physics Models of Geant4 using data from CMS Experiment

October 2016

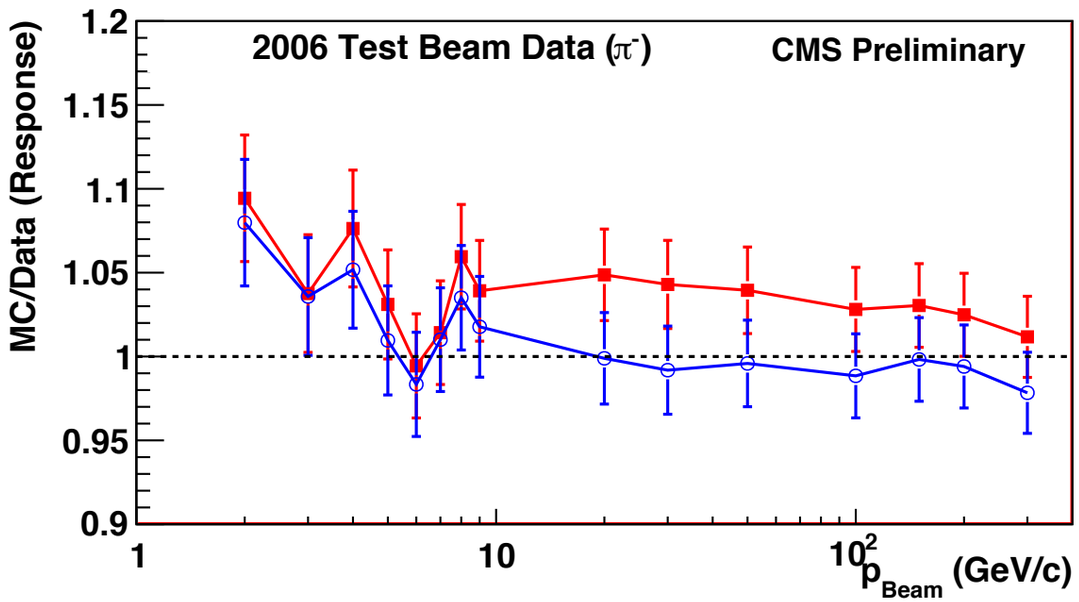
Sunanda Banerjee
(on behalf of CMS Collaboration)

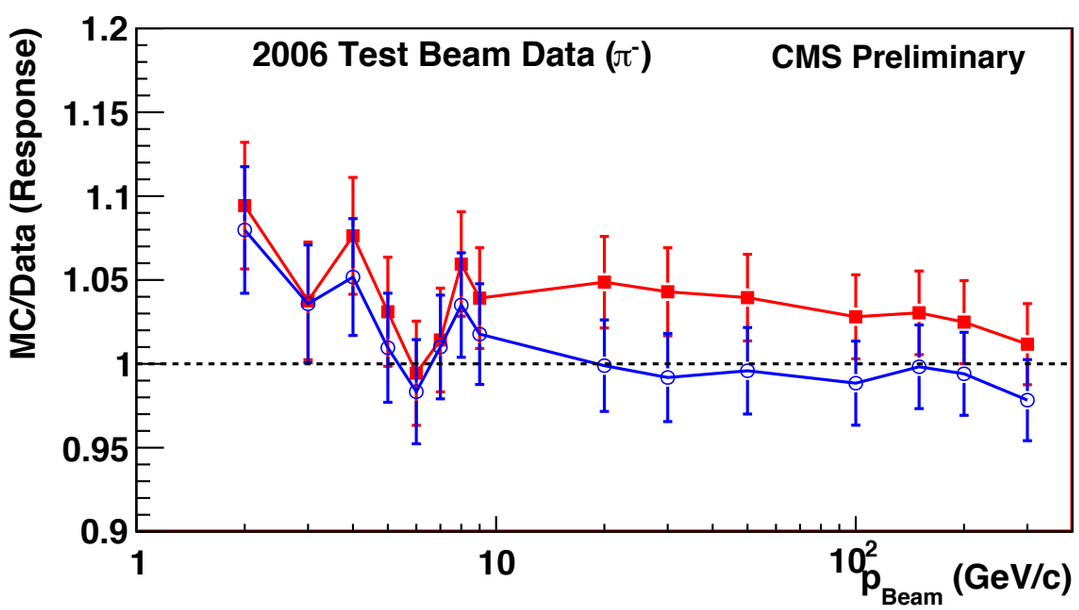
Test Beam Data

- CMS uses 2006 test beam with CMS calorimeter prototypes to validate physics models used in the simulation application



2006 H2 TestBeam

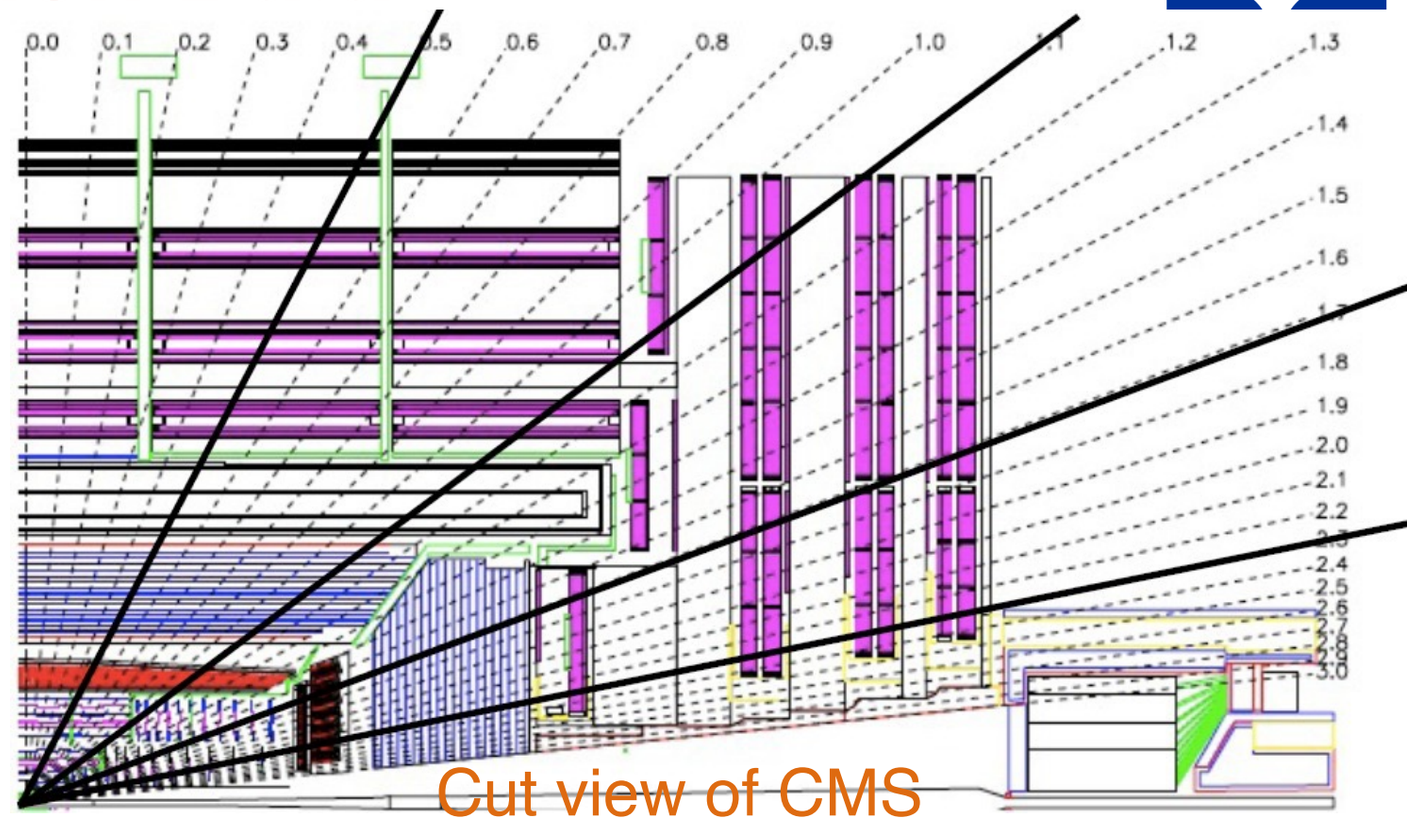


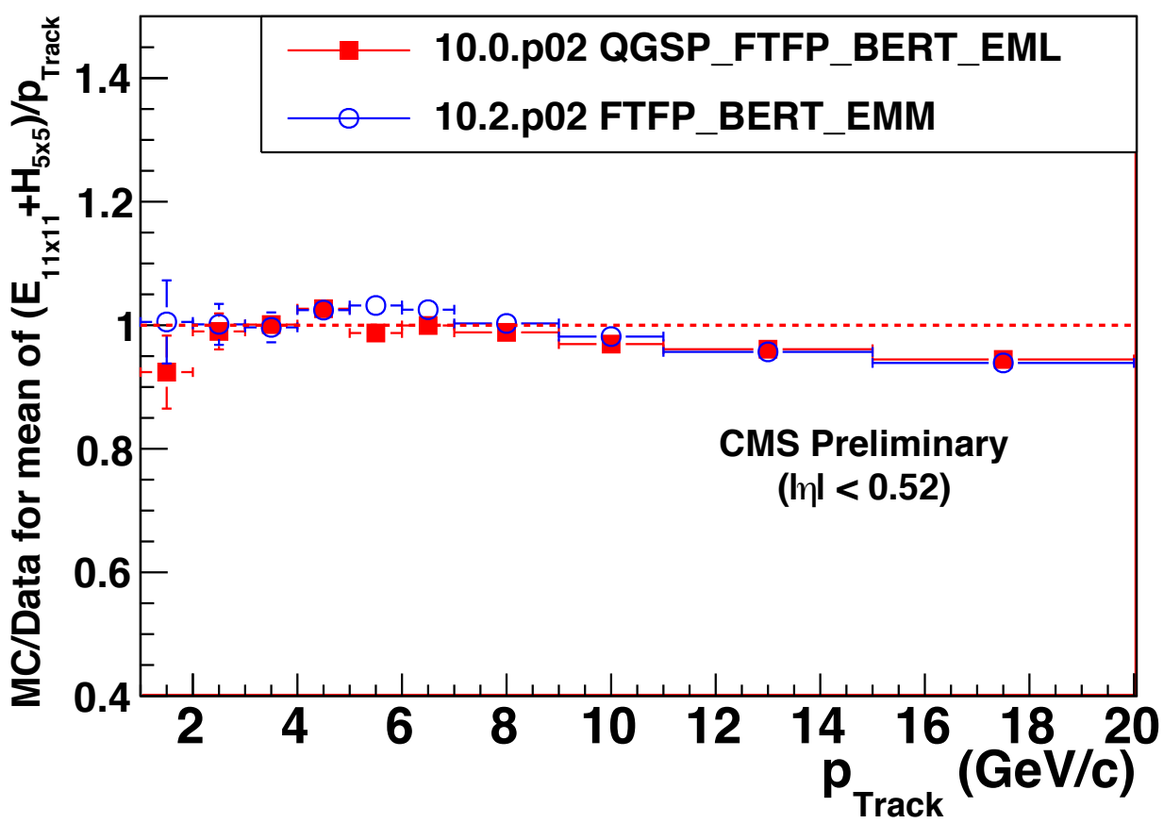


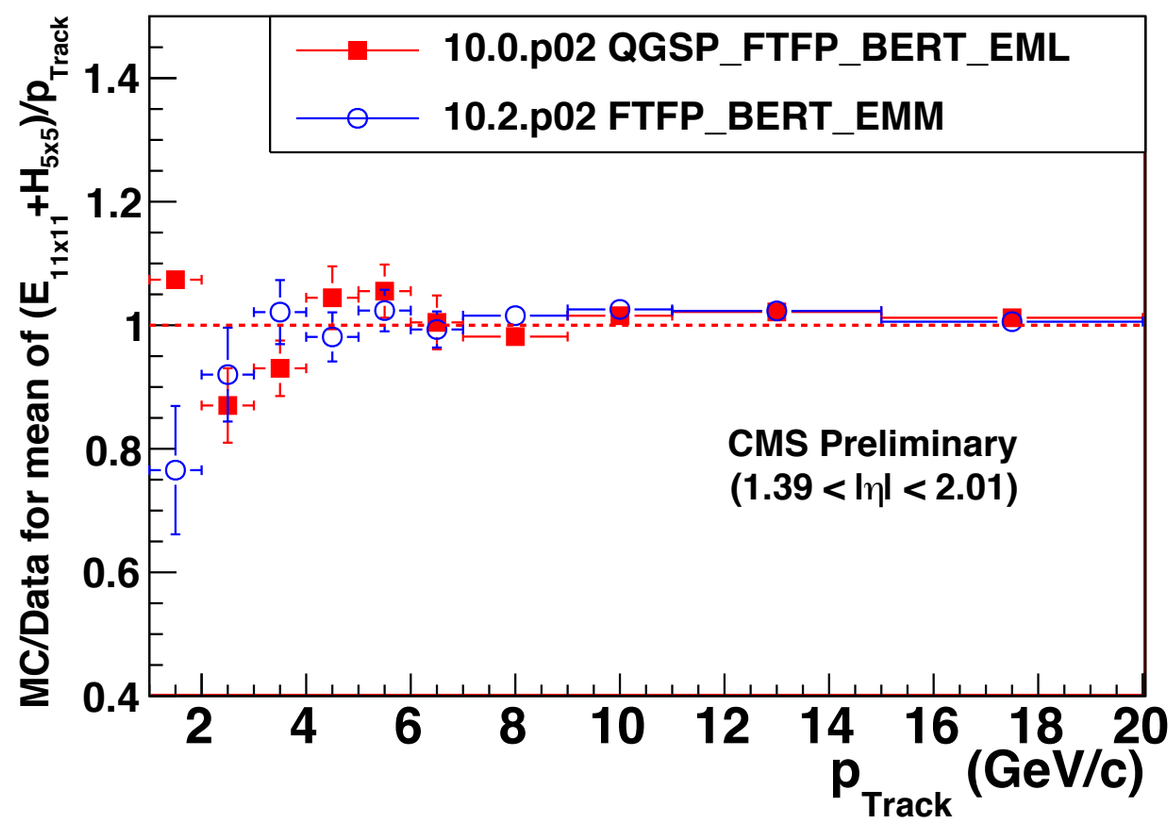
- The level of agreement between data and MC improves in the new model (Geant4 10.2.p02 FTFP_BERT_EMM) for pions, protons and anti-protons with respect to the earlier version (Geant4 10.0.p02 QGSP_FTFP_BERT_EML) used in the CMS simulation application

Collision Data

- Use measurements from isolated charged hadrons in low luminosity collision data
- Combine energy measurements from a matrix of NxN cells around the cell hit by the extrapolated track to the calorimeter surface
- Compare data with simulation results







- The mean level of disagreement between data and MC is between 2 and 5%