



CMS VALIDATION OF GEANT4 10.6

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Introduction

- Geant4 10.6cand00 was installed at special CMSSW IB
- Validations were reported by me and Sunanda to Geant4 hadronic group
 - *Our conclusions are similar – agreement between test-beam data and 10.6 simulation is degraded compared with the legacy Geant4 version 10.4p03*
 - *Geant4 experts proposed to vary Birks quenching coefficients or try out FTFP_BERT_ATL_EMM Physics list*
 - It is ATLAS proposal to use transition region between cascade and string models 3 – 12 GeV instead of 10.6 transition 3 – 6 GeV coming from thin target validations

Summary table for mean energy response χ^2/N_D

Geant4	π^+	π^-	p	pbar	K^+	K^-
10.2p02	1.02	0.61	0.51	1.69	19.0	20.7
104p03	0.73	0.45	0.80	1.79	26.8	26.2
10.6cand00	3.52	0.81	0.74	2.83	13.3	18.4
10.6cand00 ATL	2.20	0.67	0.76	2.74	22.9	31.8
10.6cand00 BkC1=0.006	1.92	0.68	0.67	1.94	17.3	18.2

Geant4 10.6cand00 demonstrates degradation for pi, pbar and some improvement is observed for kaons,

FTFP_BERT_ATL_EMM improving pions but degrades kaons

Increased BirksC1 from 0.0052 to 0.006 improving pions, p, pbar

Further tuning of Birks coefficients is possible