

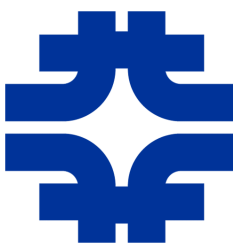
CMS Requirements from Geant4

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Improvement of Hadronic τ Decay Simulation



- CMS had been facing crashes while simulating single particle τ guns with large p_T values (~ 100 GeV)
 - This happens more in the forward direction where τ momentum could be as high as 1 TeV
 - This happens with earlier CMSSW builds (using version Geant4 version 10_2_patch02) as well as most recent CMSSW (using version 10.4)
- Thanks Makoto to provide a fix for this bug which we can use
- However, the current implementation uses phase space decay for τ 's.
- CMS requests a more realistic matrix element for decays $\tau \rightarrow \nu + \text{hadrons}$



Include Linear Polarization into HE γ Models



- This has potential usage in the analysis of $H \rightarrow \gamma \gamma$
 - Decay of scalar particles to γ 's will have the planes of polarization of γ 's to be parallel while decays of pseudo-scalar particles like π^0 the planes will be perpendicular
 - Investigate the effect of treatment of polarization in the shower shape of photons
 - May give additional handles to distinguish direct γ 's from H decay from BG γ 's
- CMS requests inclusion of effects of γ polarization in the high energy EM models