

K-Koto Meeting

2020/12/08

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Turn on Photo-Nuclear Process

- ~~MuonNuclearProcess~~
- ~~PhotoNuclearProcess~~
- ~~ElectronNuclearProcess~~
- ~~PositronNuclearProcess~~

```
*** Fatal Exception *** core dump ***
G4Track (0x7fd32cfc0820) - track ID = 810, parent ID = 808
Particle type : gamma - creator process : eBrem, creator model : eBrem
Kinetic energy : 10.6623 MeV - Momentum direction : (0.0216011,0.130586,0.991202)
Step length : 4.53014 mm - total energy deposit : 0 eV
Pre-step point : (-0.0309064,0.0303013,2.83777) - Physical volume : Lead0_0 (G4_Pb)
- defined by : not available
Post-step point : (0.0669495,0.621871,7.32805) - Physical volume : Lead0_0 (G4_Pb)
- defined by : photonNuclear - step status : 4
*** Note: Step information might not be properly updated.
```

somehow fatal error occurs...

- FTFP_BERT package
 - Recommended by Geant4 for “typical” HEP collider detector
 - Includes all standard EM processes
 - Gamma-Nuclear physics
 - Hadronic physics in range ~ 5 GeV
 - ...

FTFP_BERT package

```
// EM Physics
this->RegisterPhysics( new G4EmStandardPhysics(ver) );

// Synchrotron Radiation & GN Physics
this->RegisterPhysics( new G4EmExtraPhysics(ver) );

// Decays
this->RegisterPhysics( new G4DecayPhysics(ver) );

// Hadron Elastic scattering
this->RegisterPhysics( new G4HadronElasticPhysics(ver) );

// Hadron Physics
this->RegisterPhysics( new HadronPhysicsFTFP_BERT(ver) );

// Stopping Physics
this->RegisterPhysics( new G4StoppingPhysics(ver) );

// Ion Physics
this->RegisterPhysics( new G4IonPhysics(ver) );

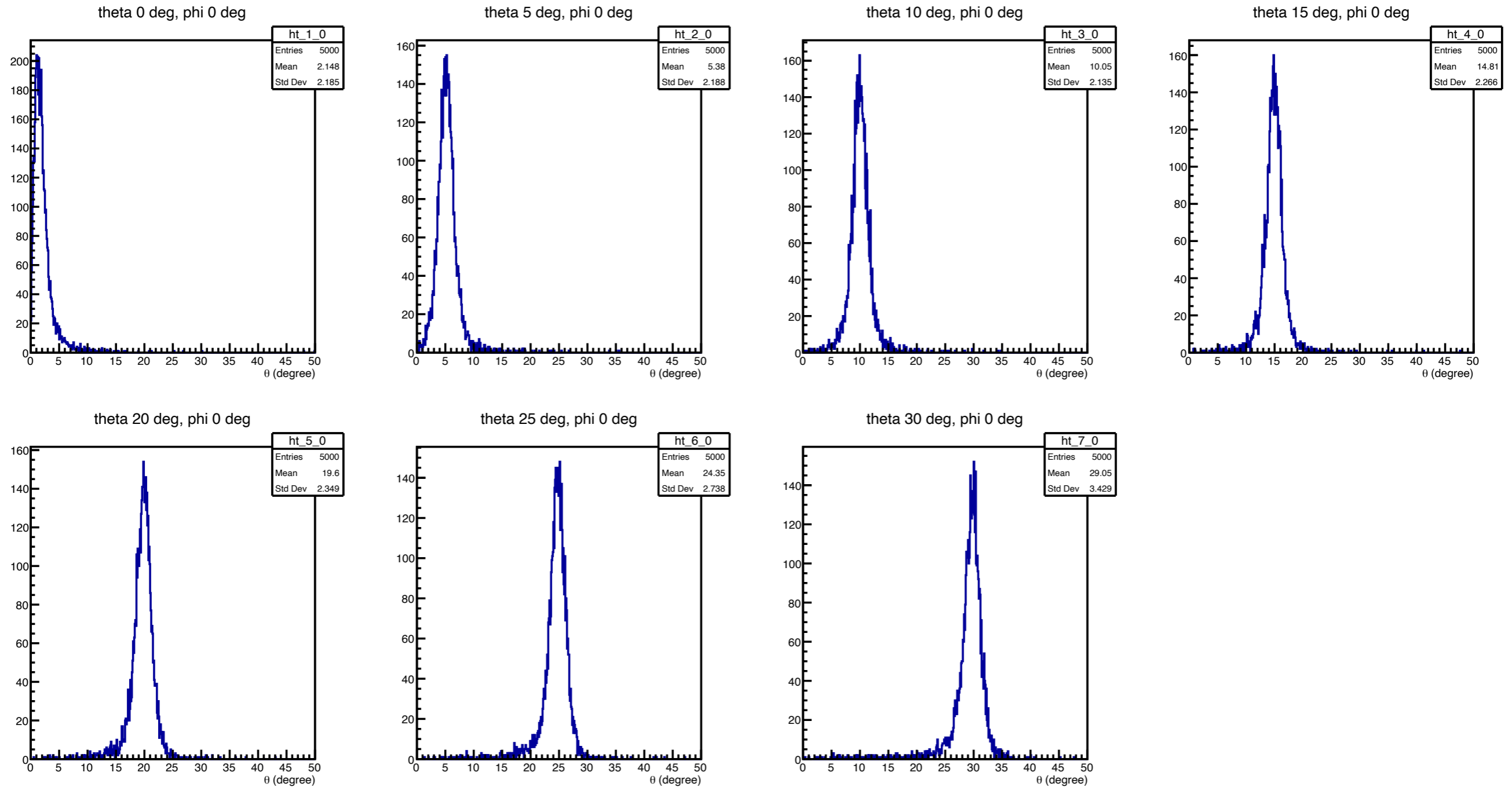
// Neutron tracking cut
this->RegisterPhysics( new G4NeutronTrackingCut(ver) );
}
```

- To be updated on Git soon

A severe bug in angle calculation!!

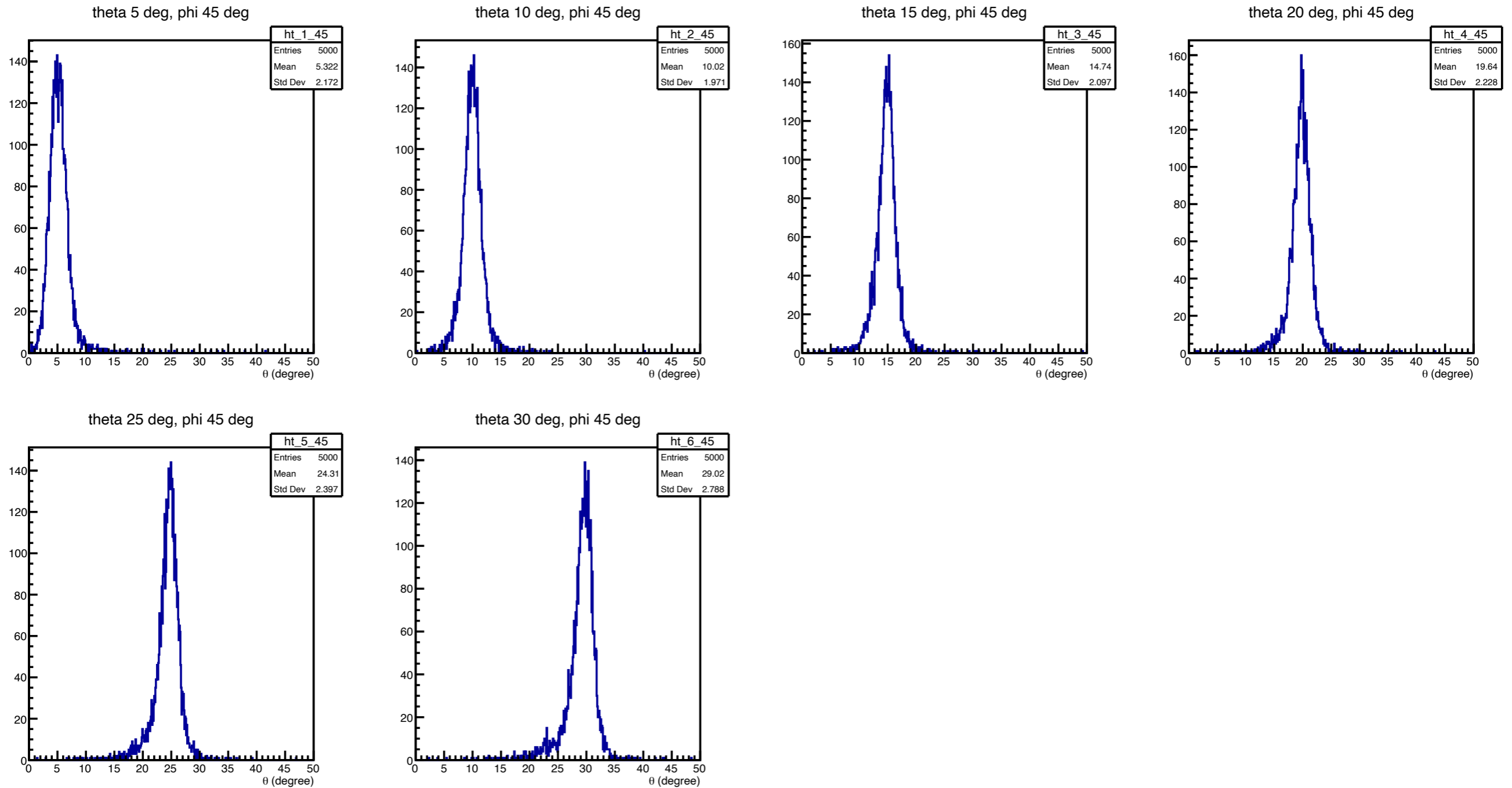
- θ_{xz} and θ_{yz} had been used as if $\tan \theta_{xz}$ and $\tan \theta_{yz}$
 - As $\tan \theta > \theta$, the θ was underestimated in higher θ region.

Fixed result - $\phi = 0^\circ$



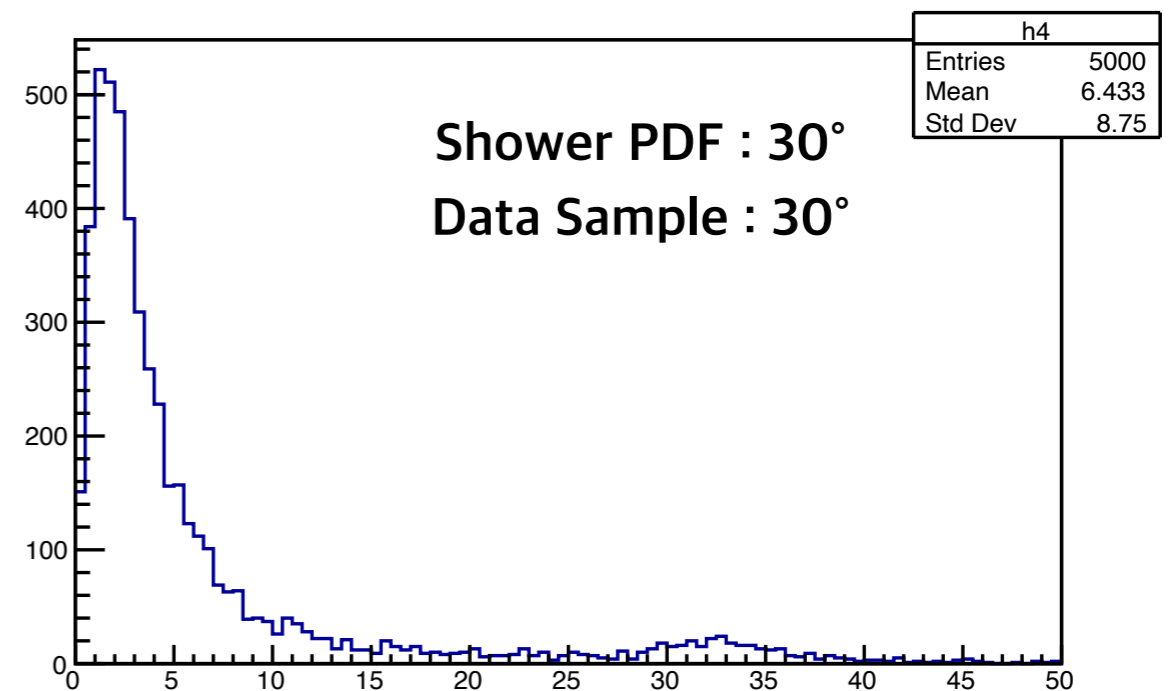
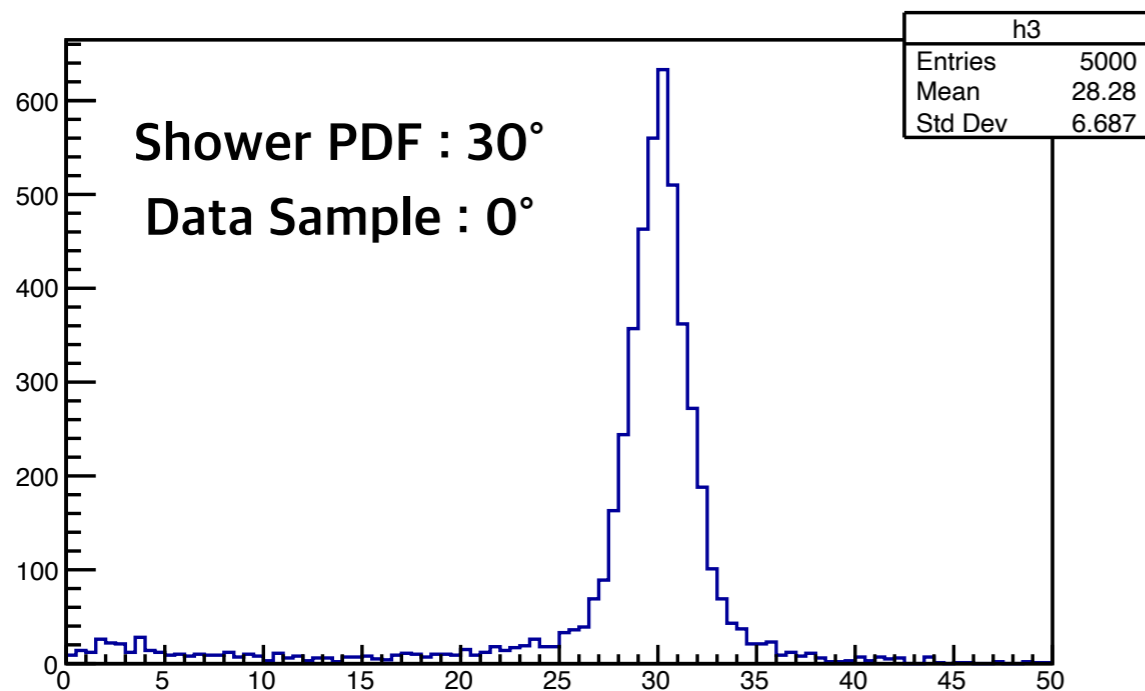
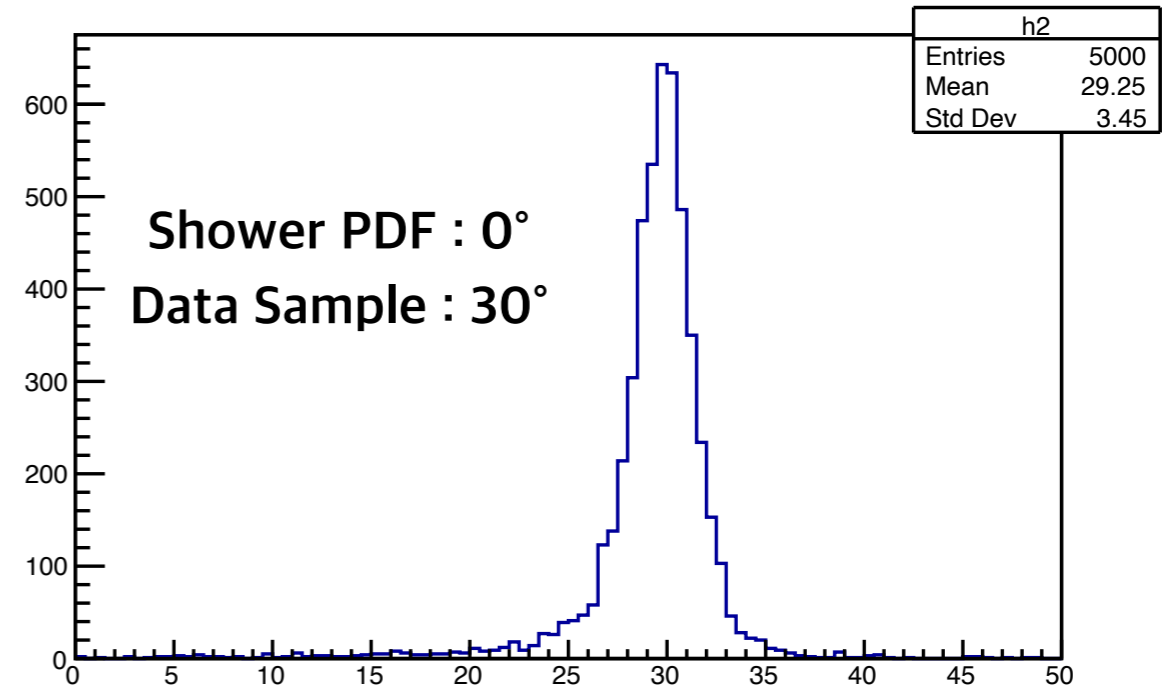
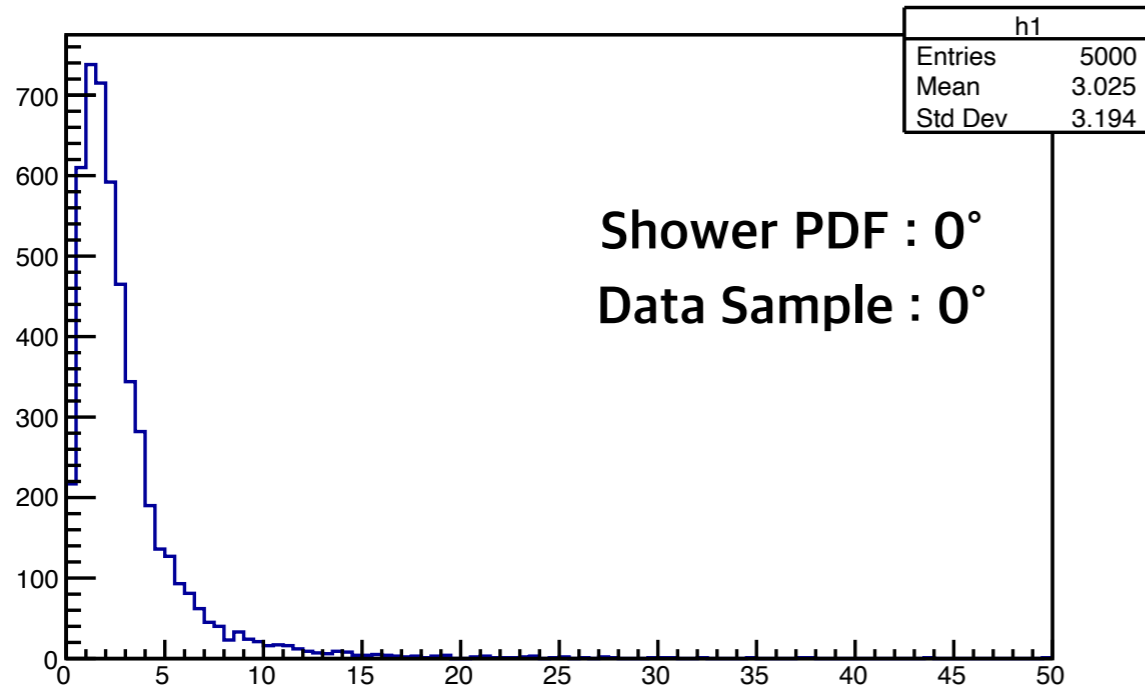
Uniform Lead
3 x 3 clustering

Fixed result - $\phi = 45^\circ$



Uniform Lead
3 x 3 clustering

0 deg, 30 deg Shower PDF Test



Backsplash Energy Loss?

Back up