

TOF Trigger Combination for TRD Cosmic Track

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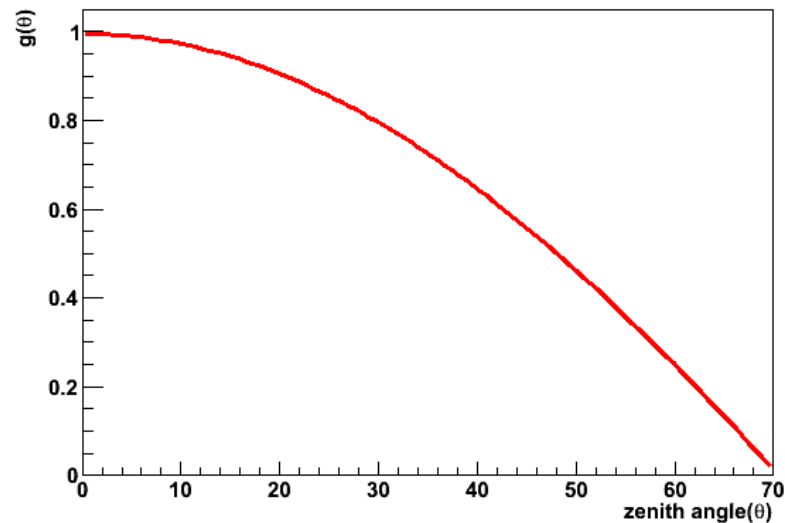
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Zenith angle dependence at surface level can be parametrized[CORSIKA],

$$\frac{dN}{d\cos\theta} \sim 1 + a(p)(1 - \cos\theta)$$

then, normalized muon angular distribution,

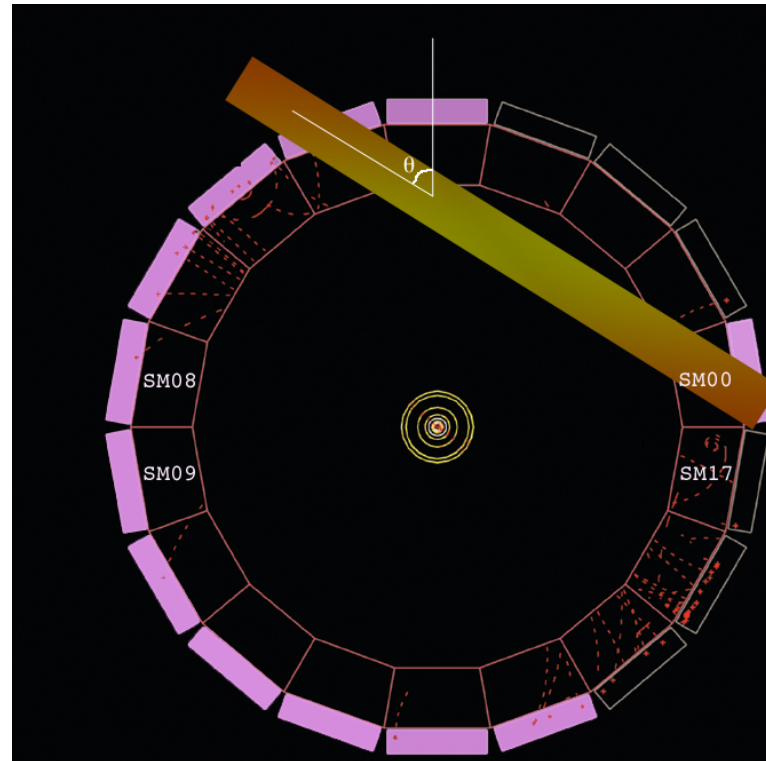
$$g(\theta) = \frac{dN}{d\cos\theta}(\theta) / \frac{dN}{d\cos\theta}(0)$$



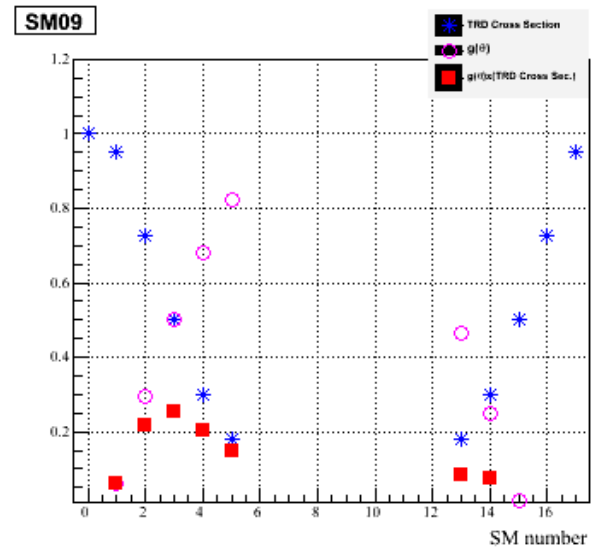
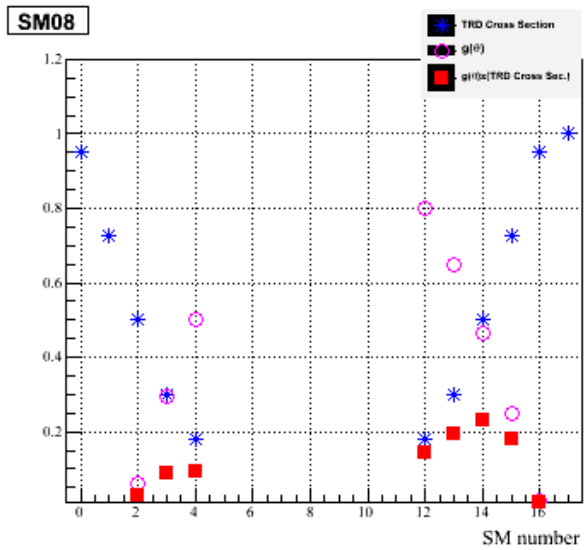
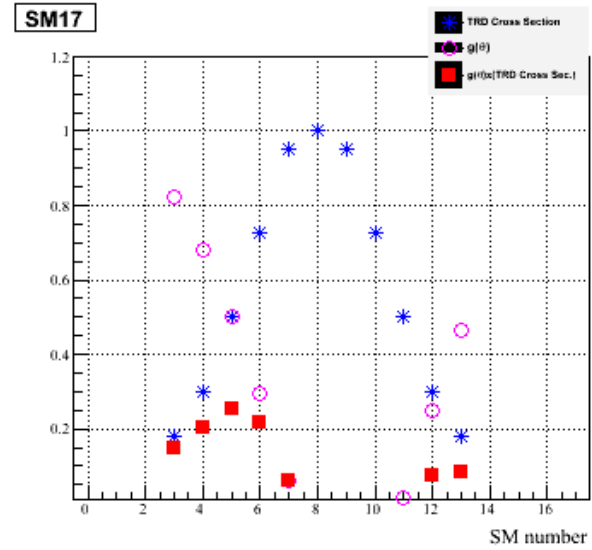
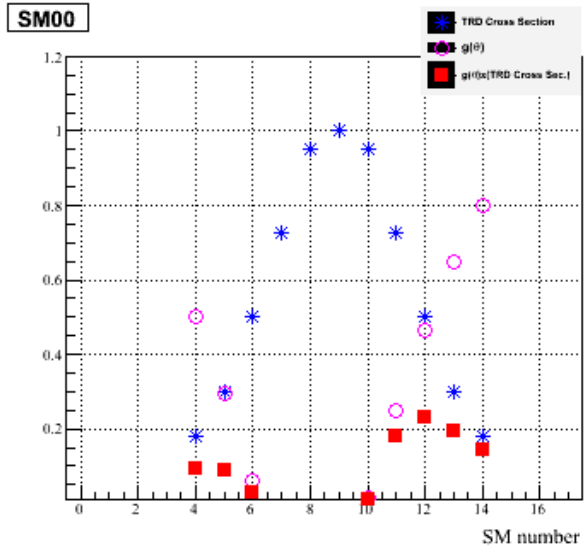
Normalized coincidence rate between two TRD modules:

$$g(\theta) \times \frac{TRD \text{ Cross Section}(\theta)}{TRD \text{ Cross Section}(\theta = 0)}$$

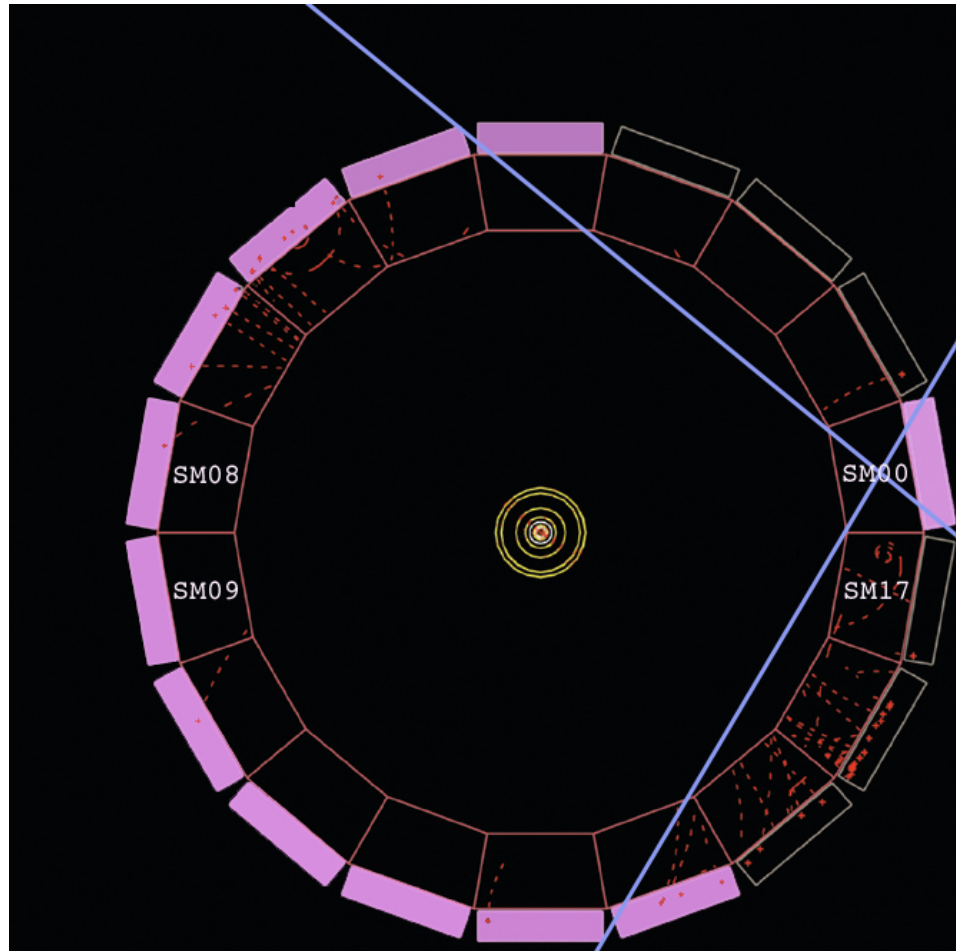
since we require tracks penetrating more than 3 layers, the TOF module in the same sector of given TRD should be involved in the intersection.



Normalized coincidence rate for given SM



Better to "OR" with several SMs, however fake trigger rate will be increased



ex) For SM00 = 0 \cap (4 \cup 5 \cup 6 \cup 11 \cup 12 \cup 13 \cup 14)

Porposal for TOF trigger combinations

- for SM00

$$0 \cap (11 \cup 12 \cup 13 \cup 14)$$

- for SM08

$$8 \cap (12 \cup 13 \cup 14 \cup 15)$$

- for SM09

$$9 \cap (2 \cup 3 \cup 4 \cup 5)$$

- for SM17

$$17 \cap (3 \cup 4 \cup 5 \cup 6)$$