Cerenkov angle reconstruction with RICH

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Method: a least squares minimization

- The AMS tracker provides the particle direction (θ, Φ) and impact point at the Rich radiator
- The Cerenkov pattern at the PMT plane is derived as function of the Cerenkov angle variable (θ_c)
- The minimization of the squares of the distances between the expected and detected hit points provides the θ_c angle

$$\chi^2(\theta_c) = \sum_{i=1}^{nhits} \left(X_i^{dat} - X^{exp}(\theta_c, \phi_i)\right)^2 + \left(Y_i^{dat} - Y^{exp}(\theta_c, \phi_i)\right)^2$$

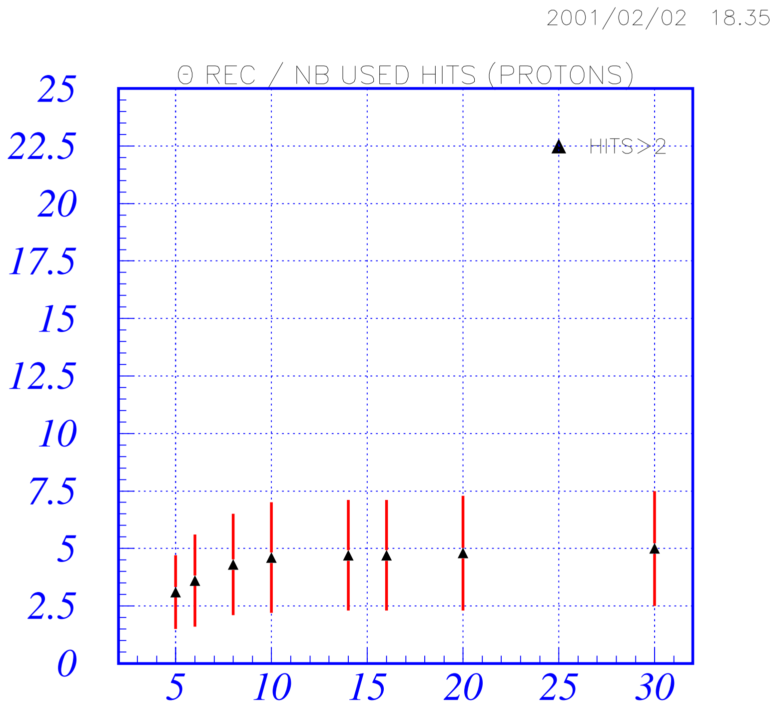
- The hit points associated to the track are excluded

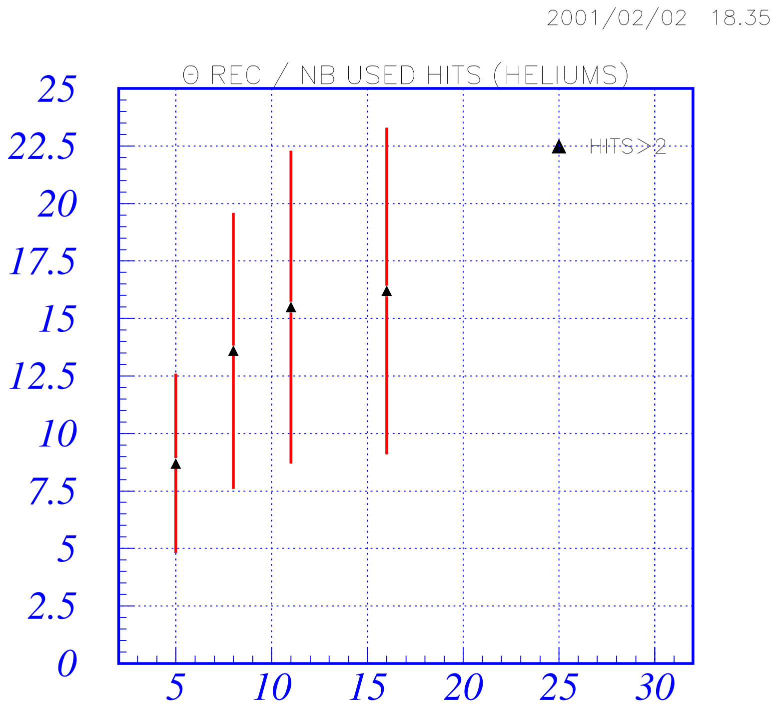
Rich Geometry

Samples of protons and heliums have been simulated trough the Standalone Rich Simulation.

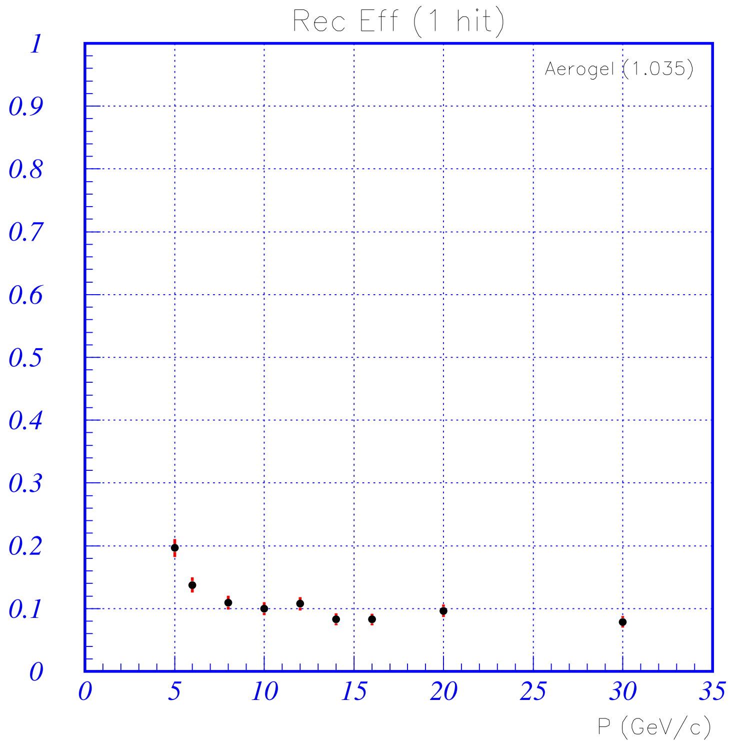
- aerogel: 1.035 clarity: $0.011\mu m^4\ cm^{-1}$

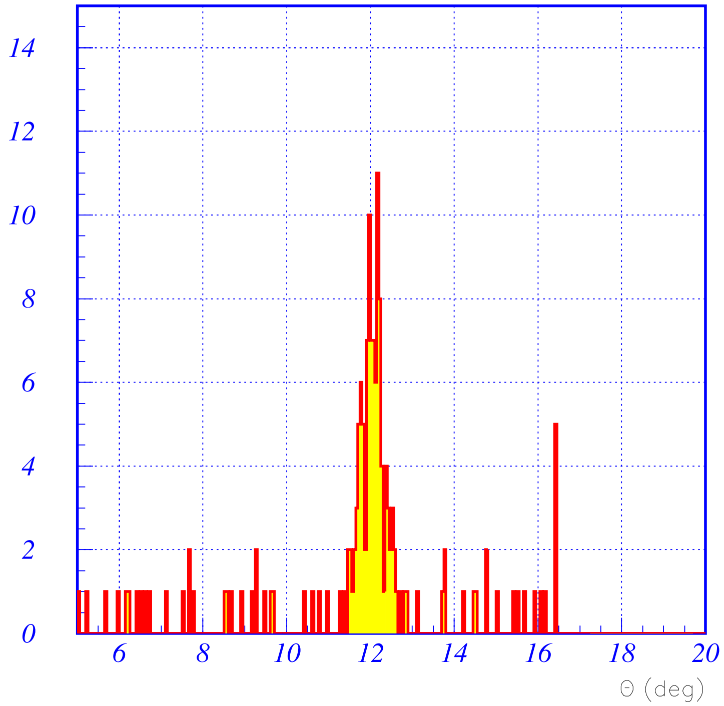
The number of used hits in reconstruction



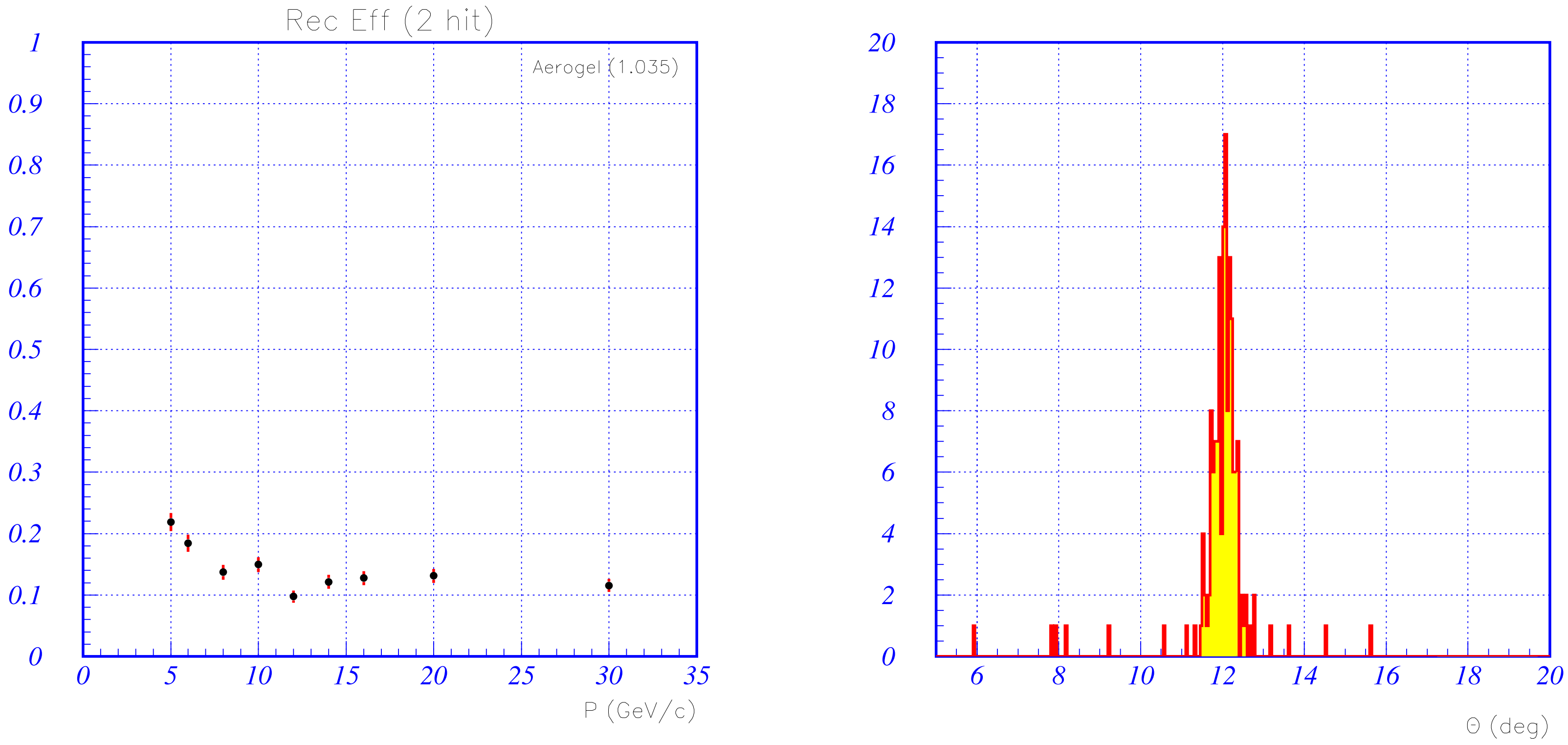


Protons: 1 hit events

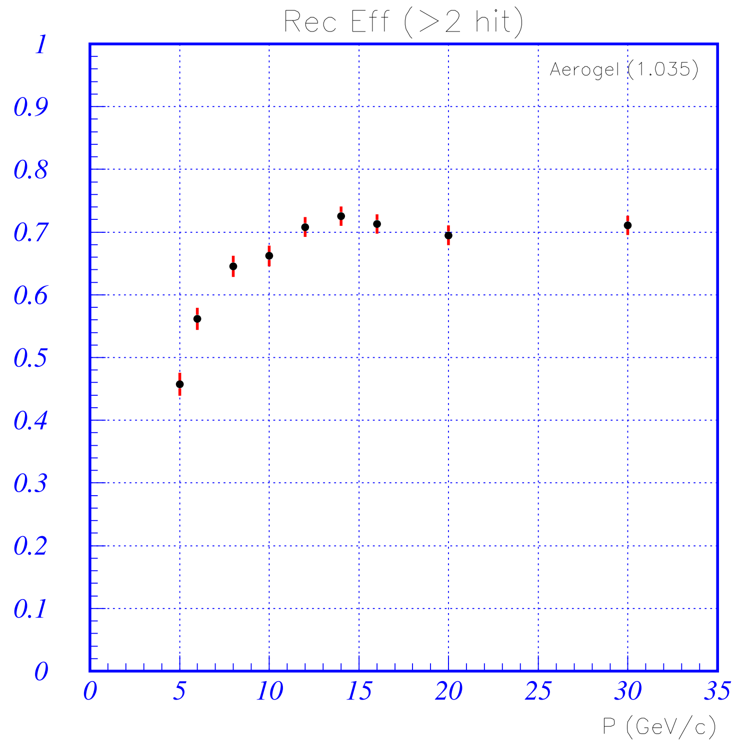


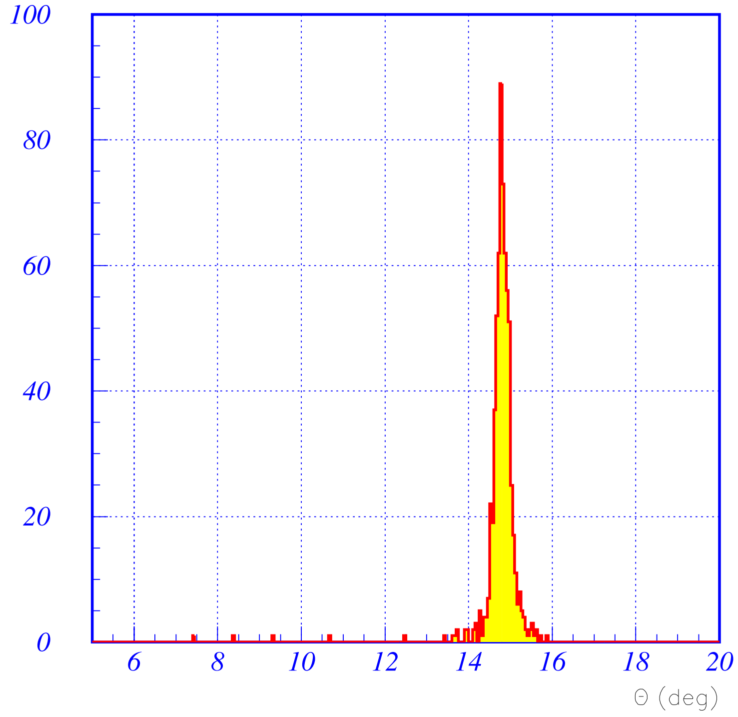


Protons: 2 hit events



Protons: > 2 hit events





The reconstructed cerenkov angle (θ_c)