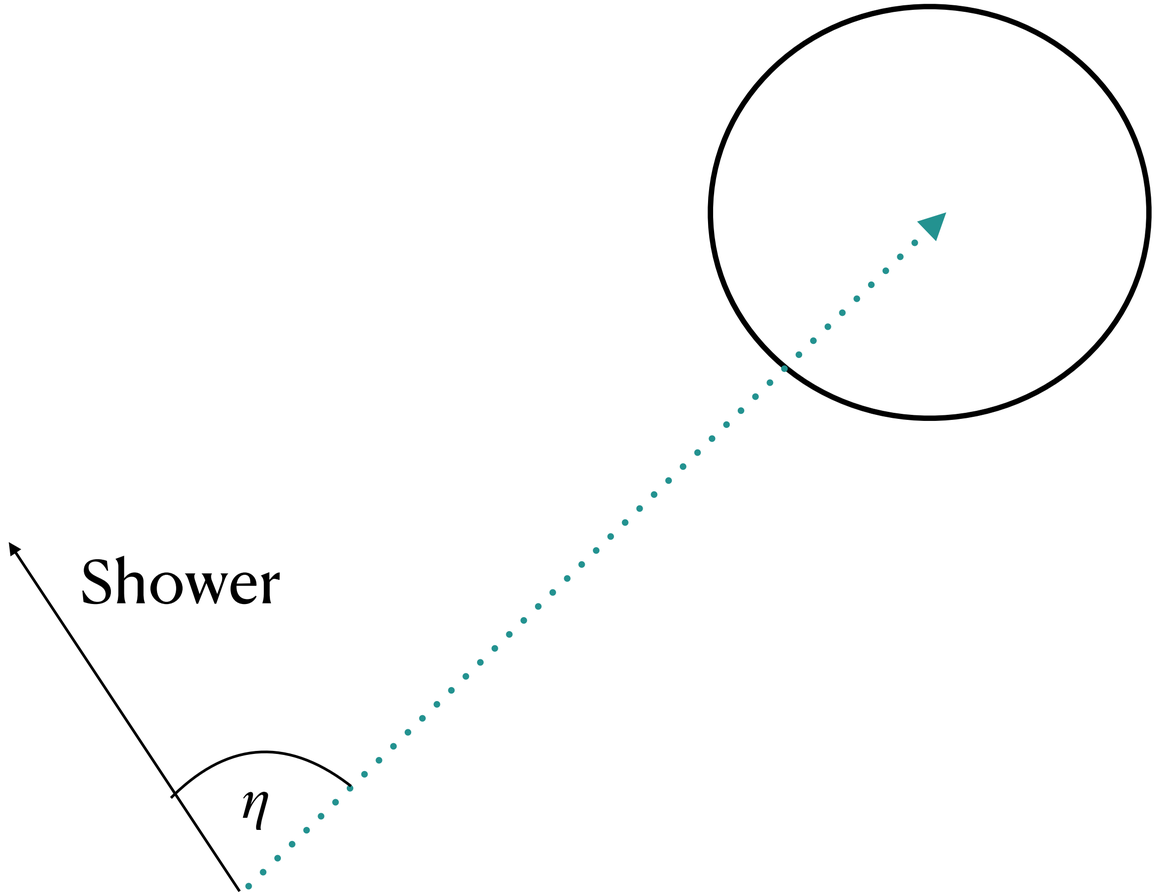
Jpp PDF and MC true data

Comparison - V2

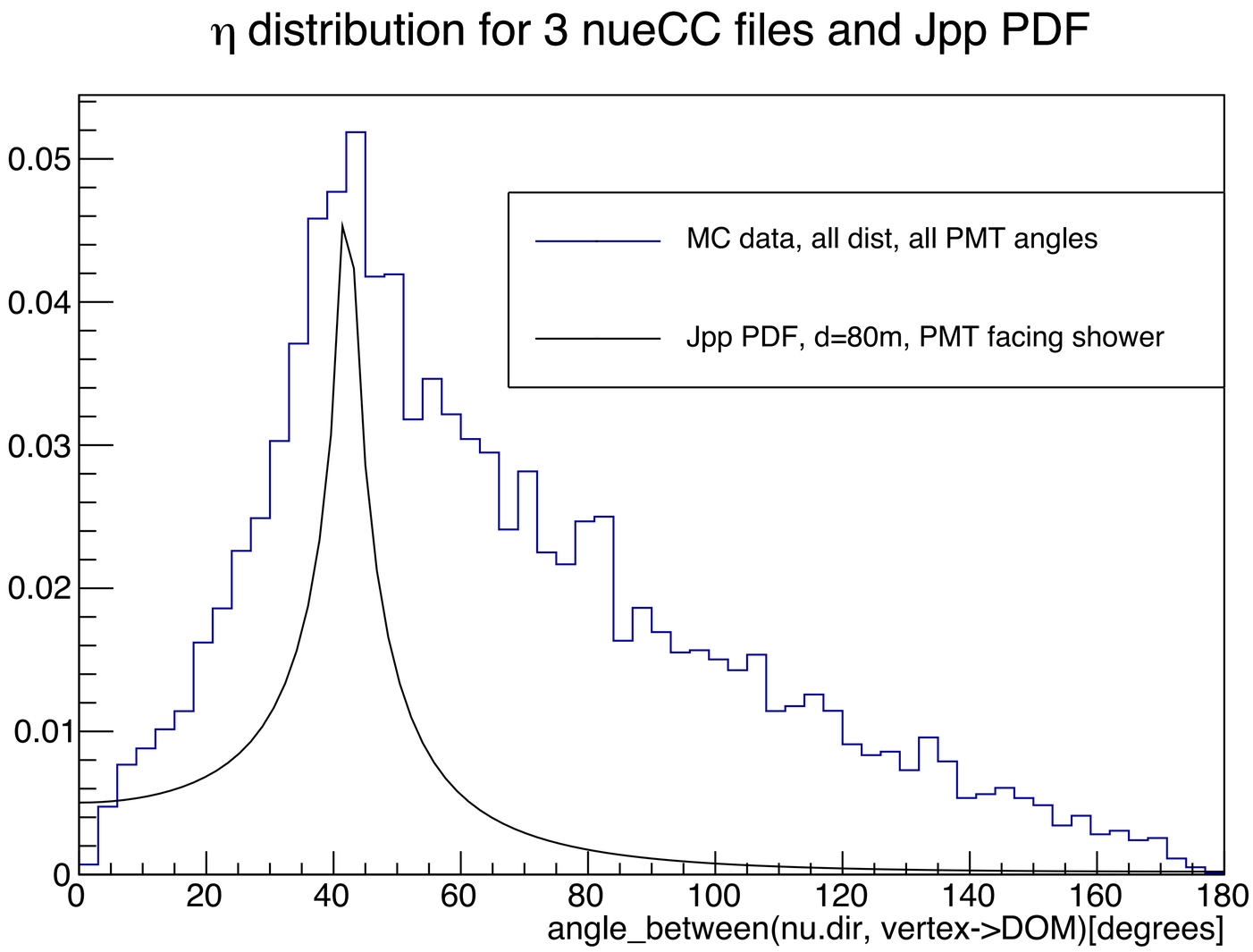
Overview

- Jpp PDF: $\frac{dn_{pe}}{dt}(E, d, cos(\eta), \theta, \phi, r)$
  - d: distance to shower maximum [m]
  - η: angle between shower direction and vector vertex—>DOM [0,π] *(angle_between(nu.dir, vertex->DOM))*
  - θ: zenith angle with respect to shower direction [0,π]
  - ϕ: azimuthal angle [0,2π]
  - r: hit time residual [ns]



Direction of hits wrt shower direction

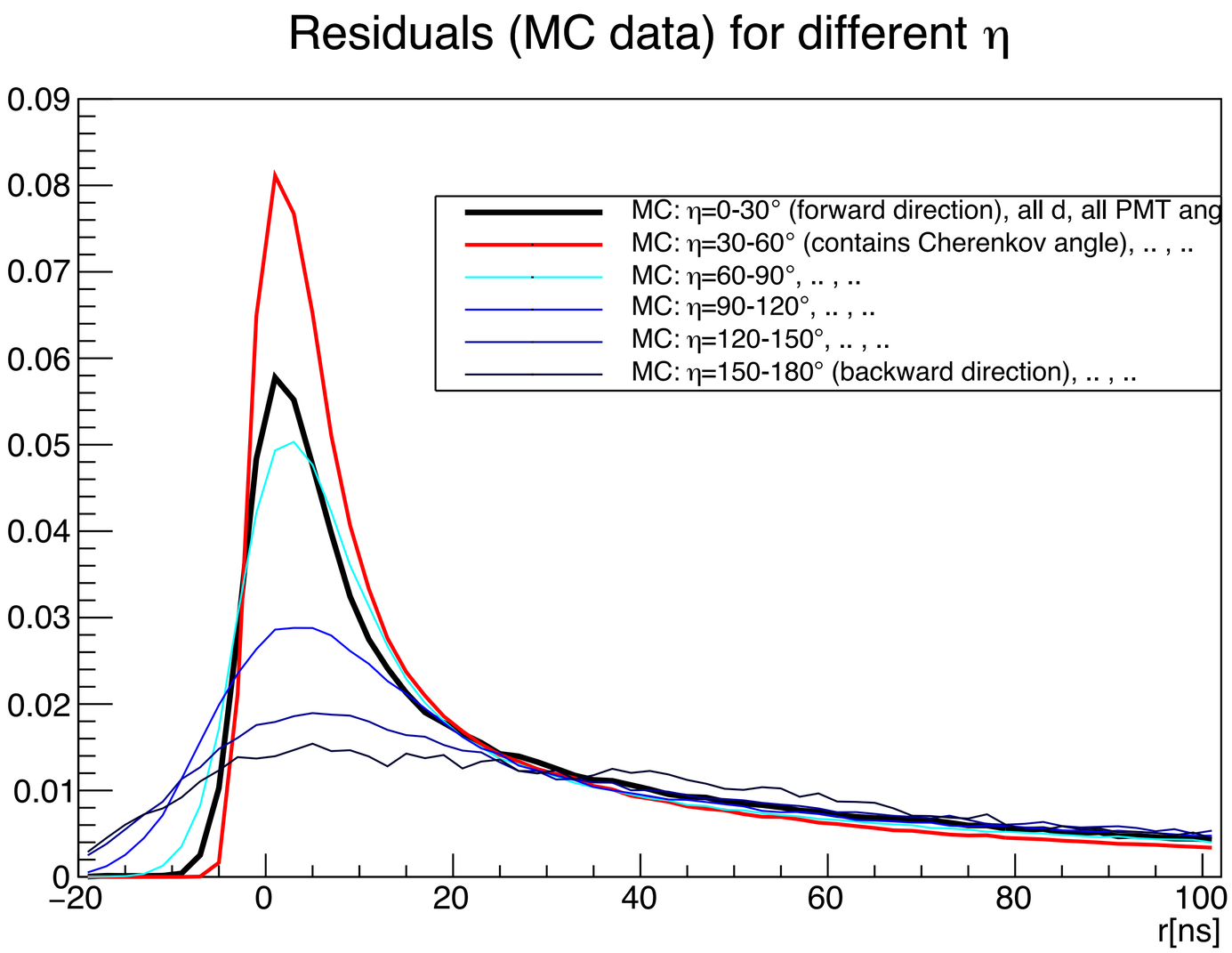
- Distribution of η for all hits in 1 nueCC files
- Compared with Jpp PDF for PMTs facing the shower
- MC data is more smeared due to superposition of
  - More PMT angles
  - More distances



MC data: hit residuals

- Backward direction: som hits arrive early (r<0)

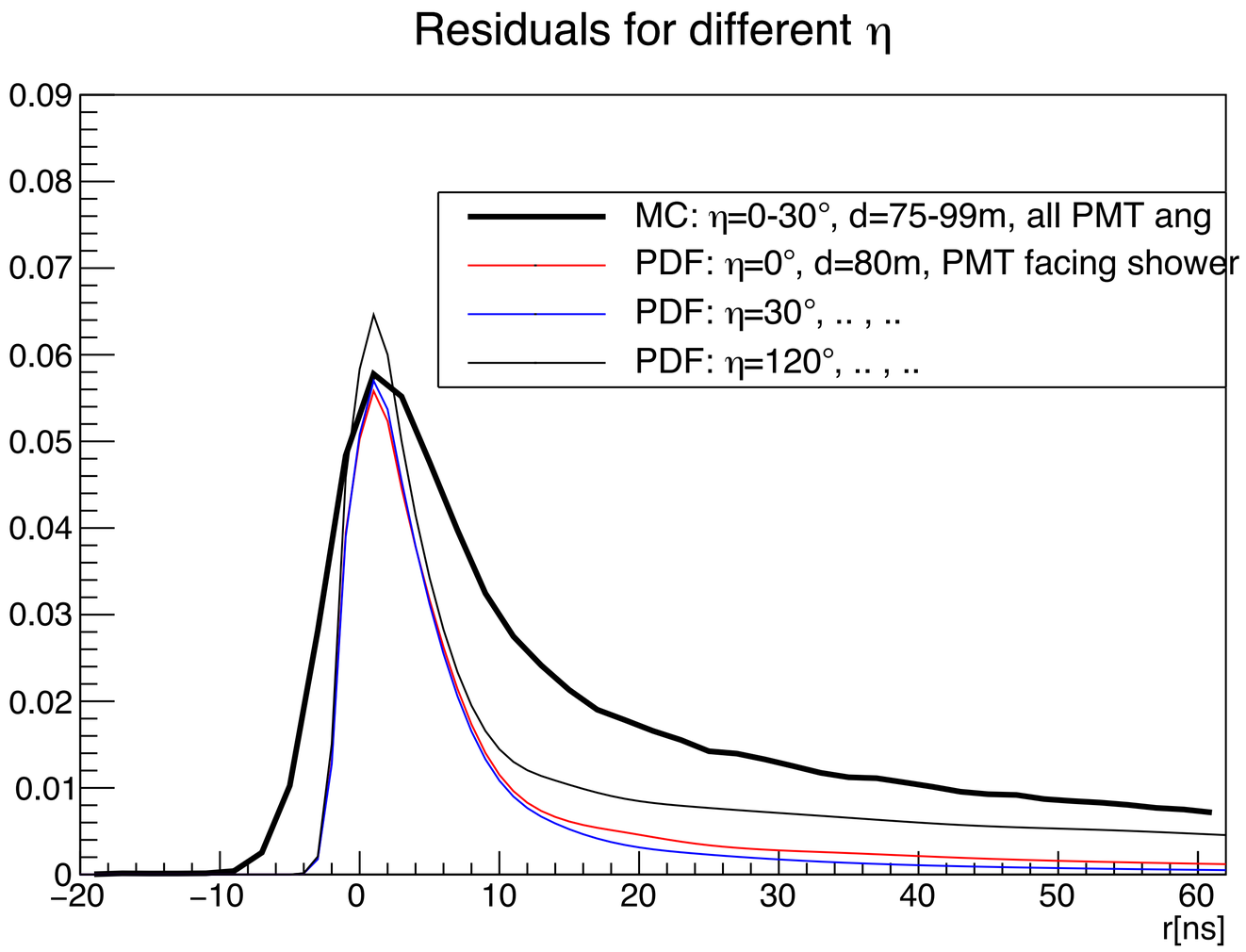
- These hits might originate from the vertex instead of the shower maximum?



MC data vs PDF

Forward direction

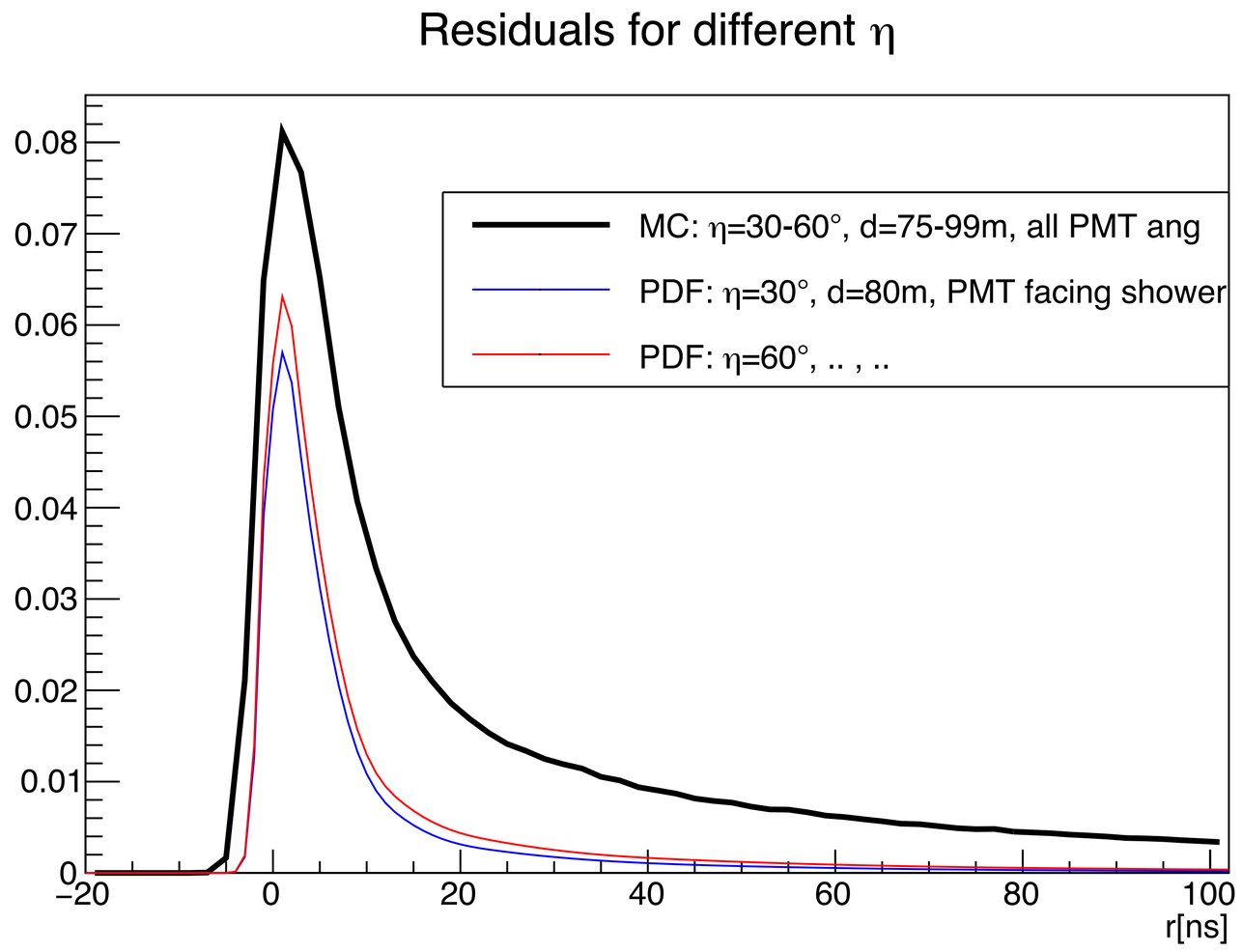
- Again, some of the early hits of the MC data are not reproduced by the PDF



MC data vs PDF

Forward direction II

- Around the Cherenkov angle, the PDF and data are comparable



MC data vs PDF

Backward direction

- Not enough statistics?
- Hits from MC data can arrive early because they can originate from vertex instead of shower maximum?