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U.S. DEPARTMENT OF ENERGY
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First Look at Tracking Performance with DD4HEP

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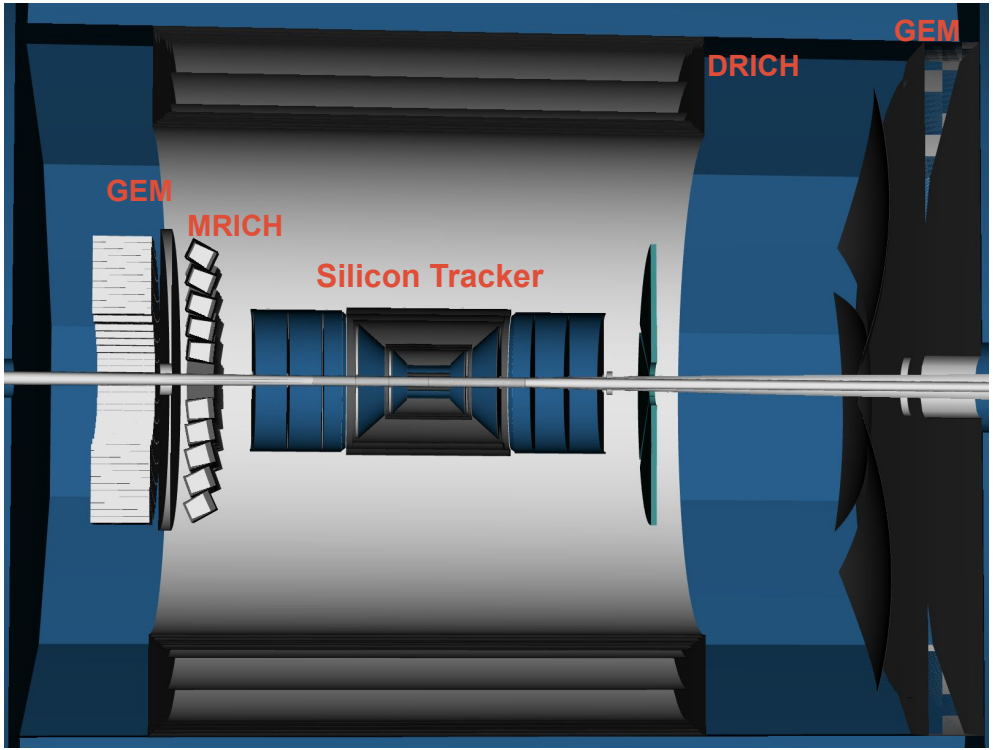
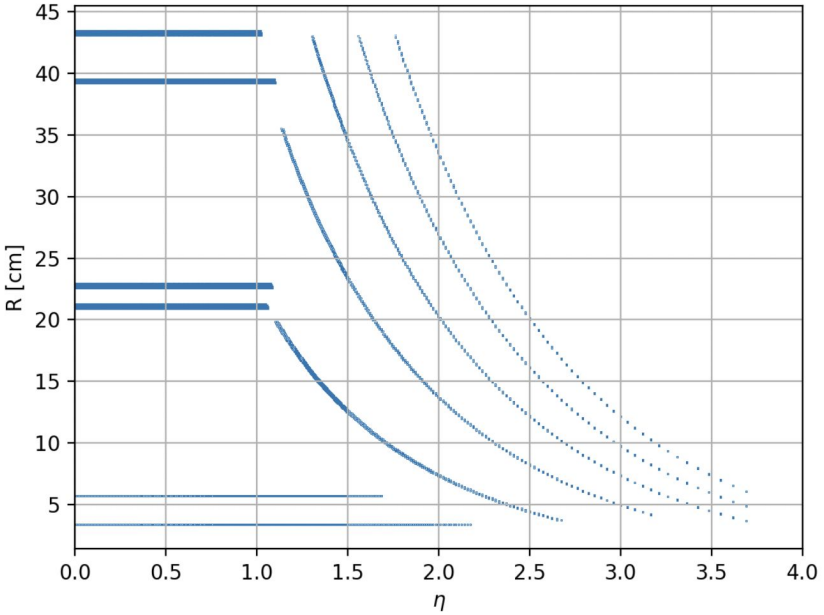
Thanks: Whitney Armstrong, Sylvester Joosten, Wouter Deconinck, Reynier Cruz Torres, Ernst Sichtermann

ATHENA Tracking WG meeting
Aug 31, 2021

Acadia-v1 Configuration





Acadia-v1 Configuration

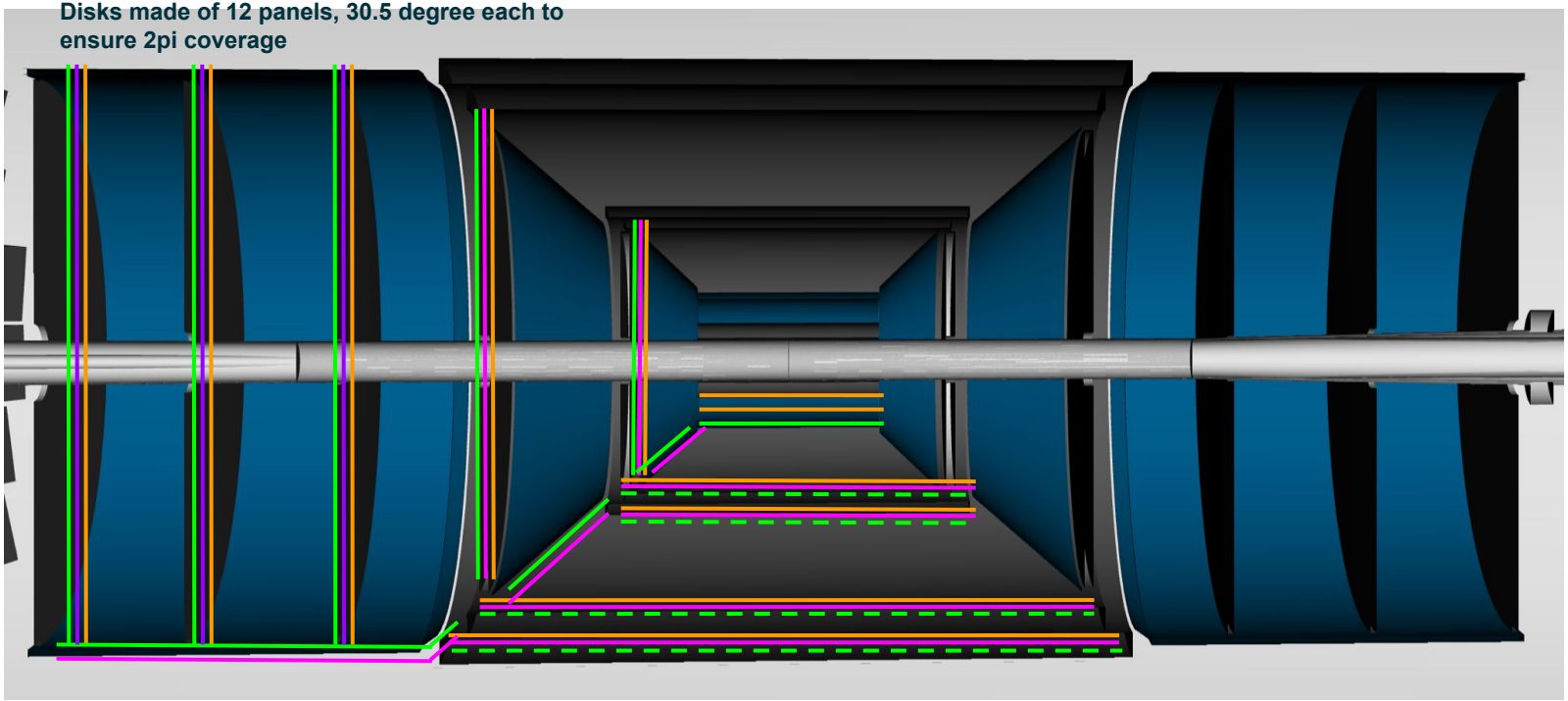
See material scan from Aug 24 meeting

Silicon
Aluminum
CarbonFiber

Dashed line: staves from ITS2 design
Disks made of 12 panels, 30.5 degree each to ensure 2pi coverage

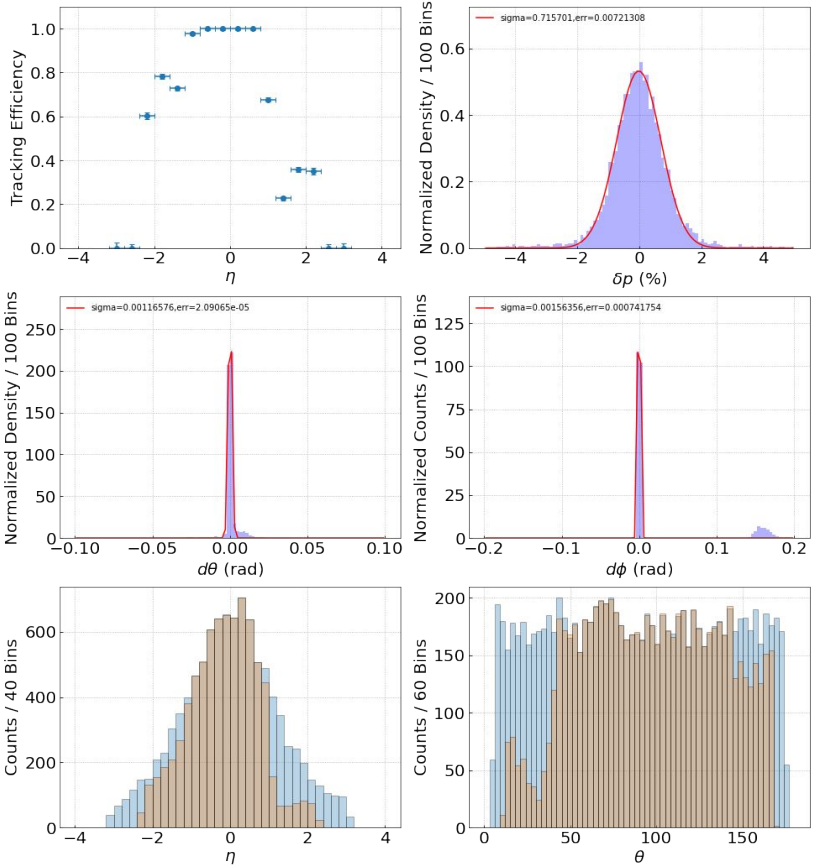
To do:

- 2mm carbon shell around the outer barrel
- Disk-like connection b/w the end of vertex layer and the cone
- flush the cone



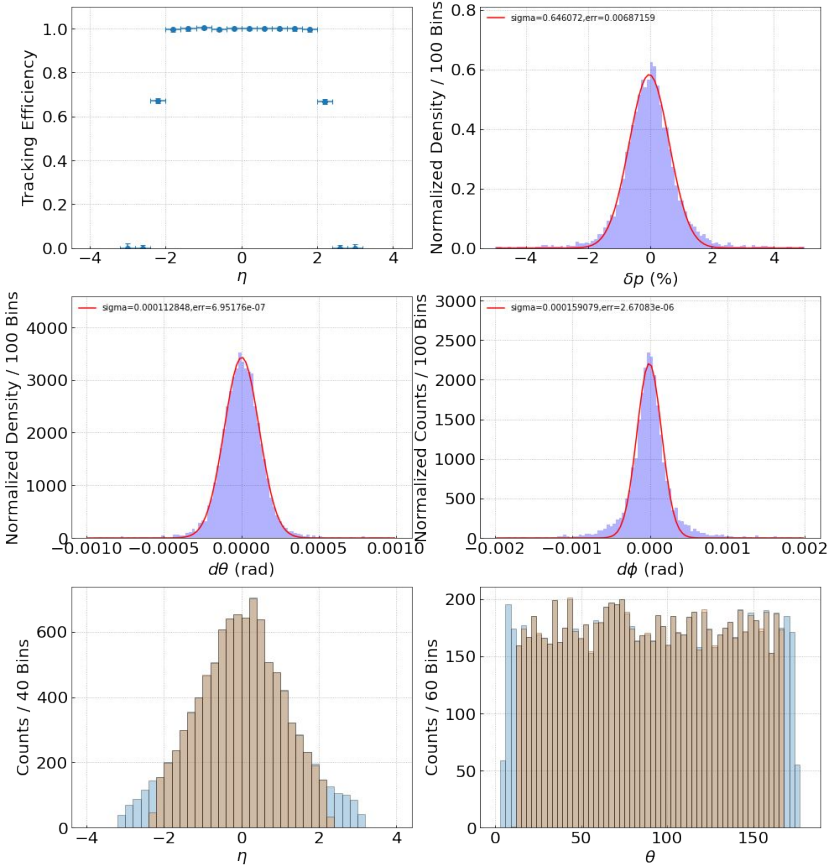
Standard Configuration

Tracker Benchmark (Truth Init.)



Remove MRICH and DRICH

Tracker Benchmark (Truth Init.)



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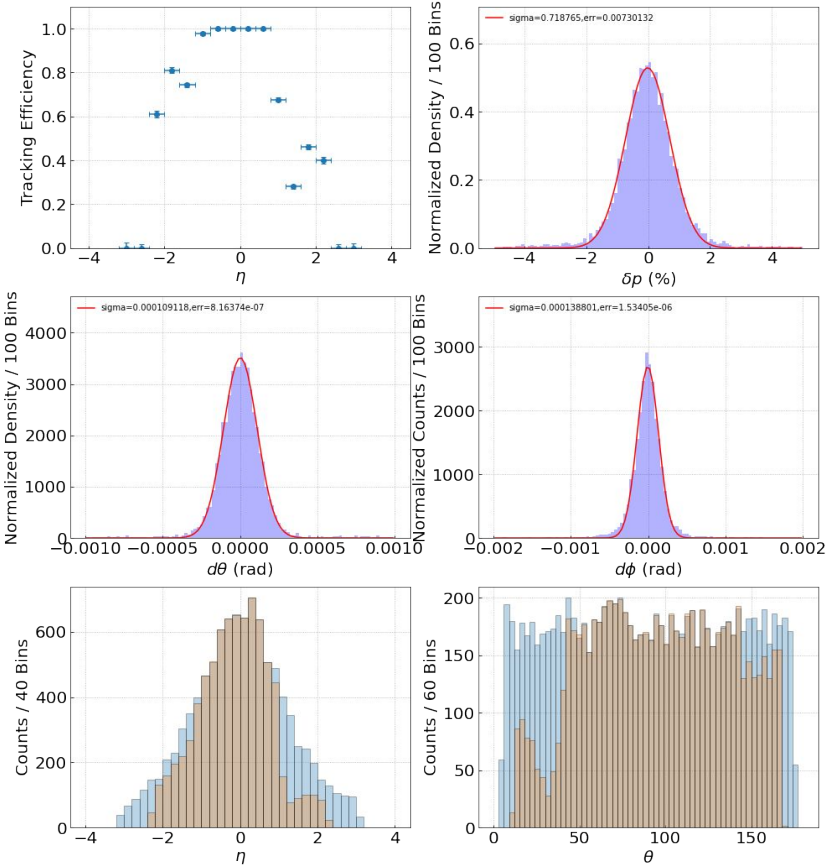

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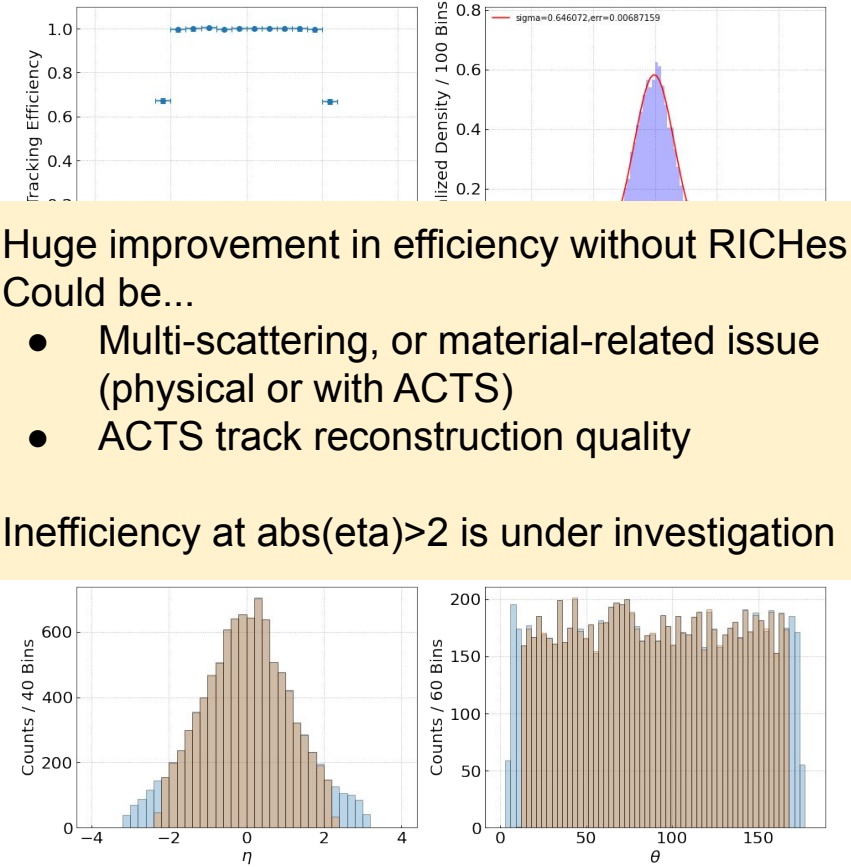
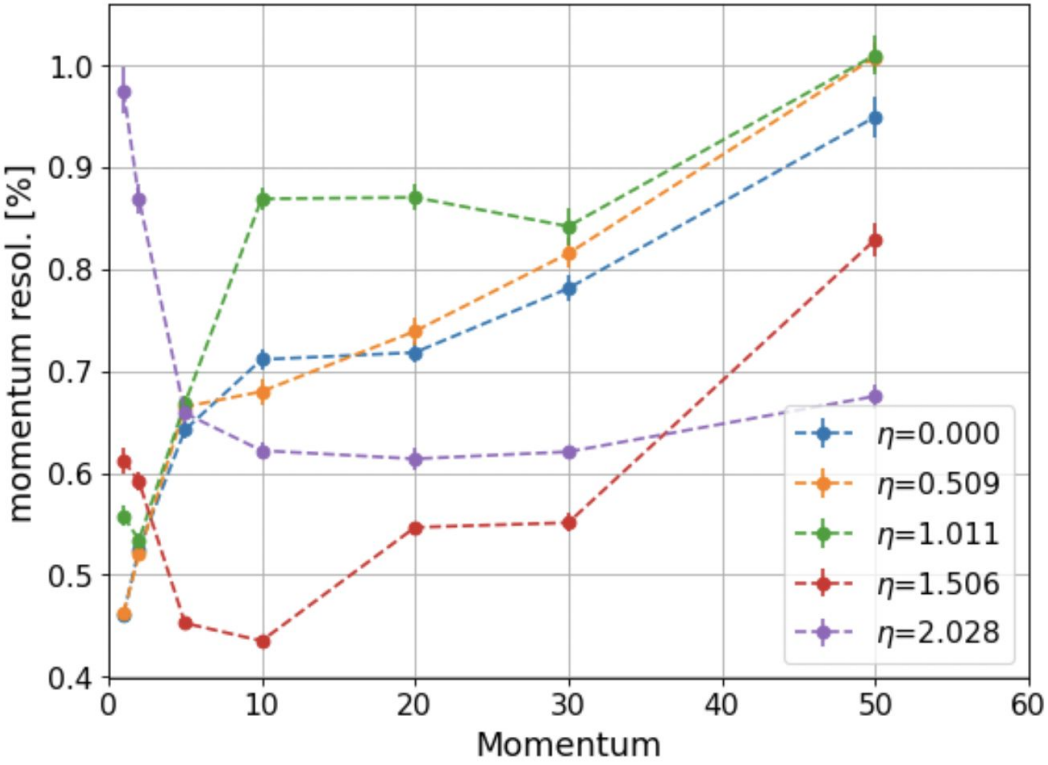


Huge improvement in efficiency without RICHes. Could be...

- Multi-scattering, or material-related issue (physical or with ACTS)
- ACTS track reconstruction quality

Inefficiency at abs(eta)>2 is under investigation

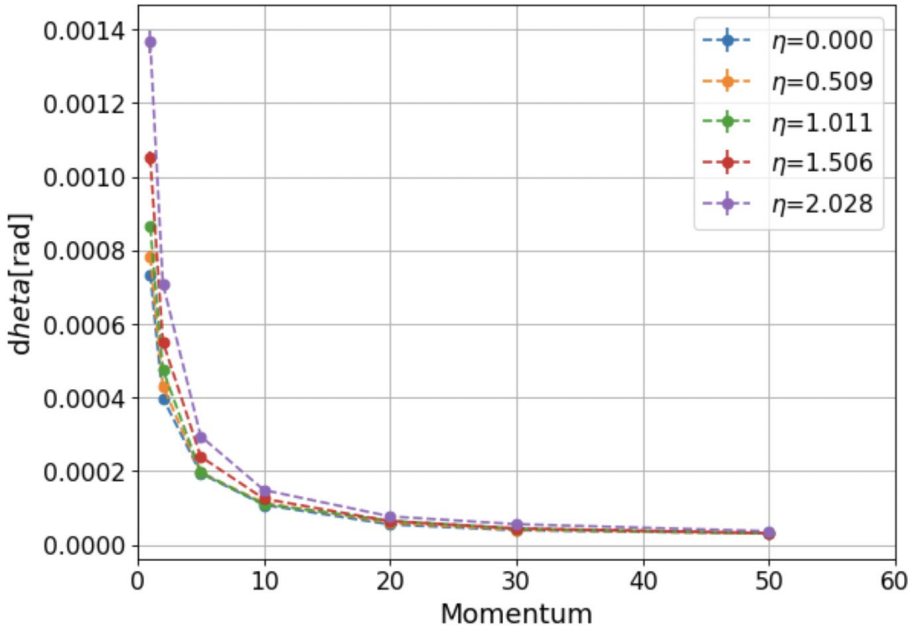
dp/p Resolution v.s. Momentum at vertex (a very first look)



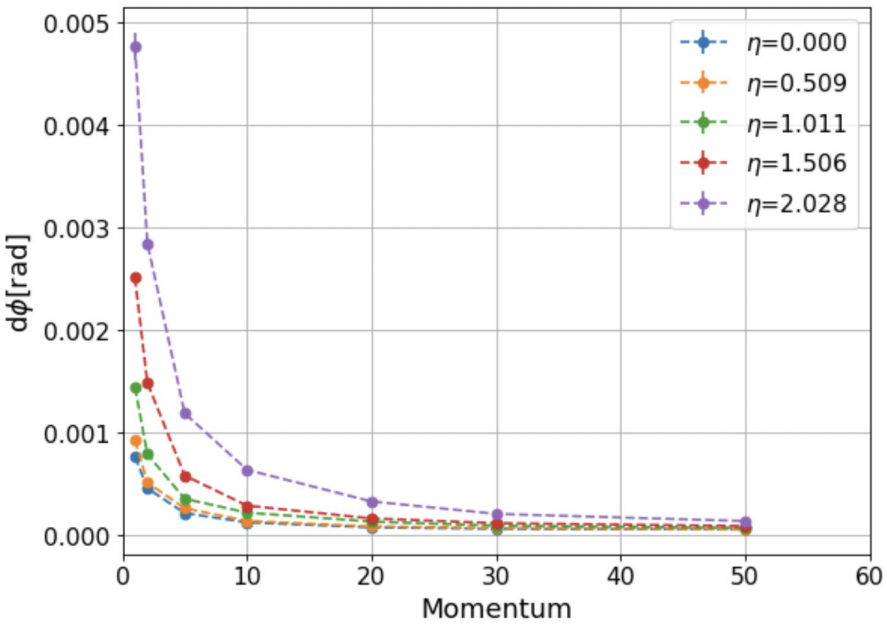
Overall within a factor of two of expectations, and still lots of work remains…

Angular Resolution (a very first look)

Theta



phi



Same order of resolution comparing to Fun4All. More study to be done