DIRC OPTIMIZATION UPDATE 7/20/21

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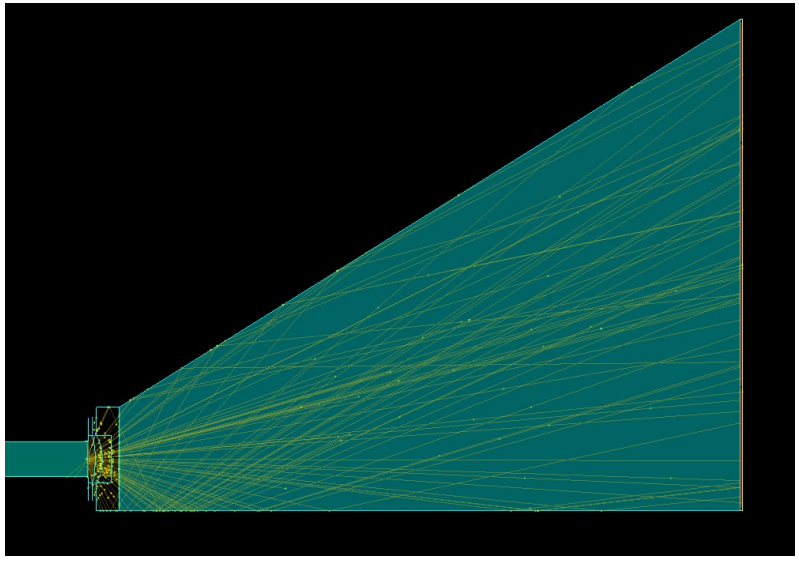
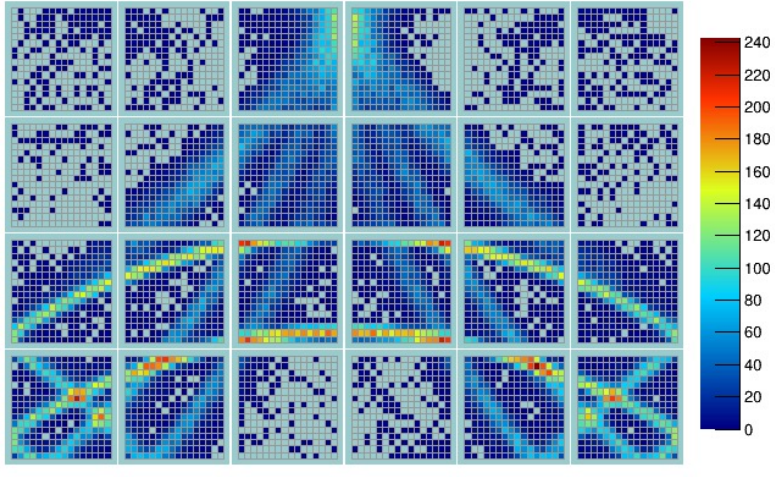
DIRC Software

- Work in progress!
- Currently optimizing
  - 5 configurations for focusing system
  - 4 settings for readout
  - 4 configurations for expansion volume
- Working with PID Group Greg Kalicy and Nilanga Wickramaarachchi (CUA)

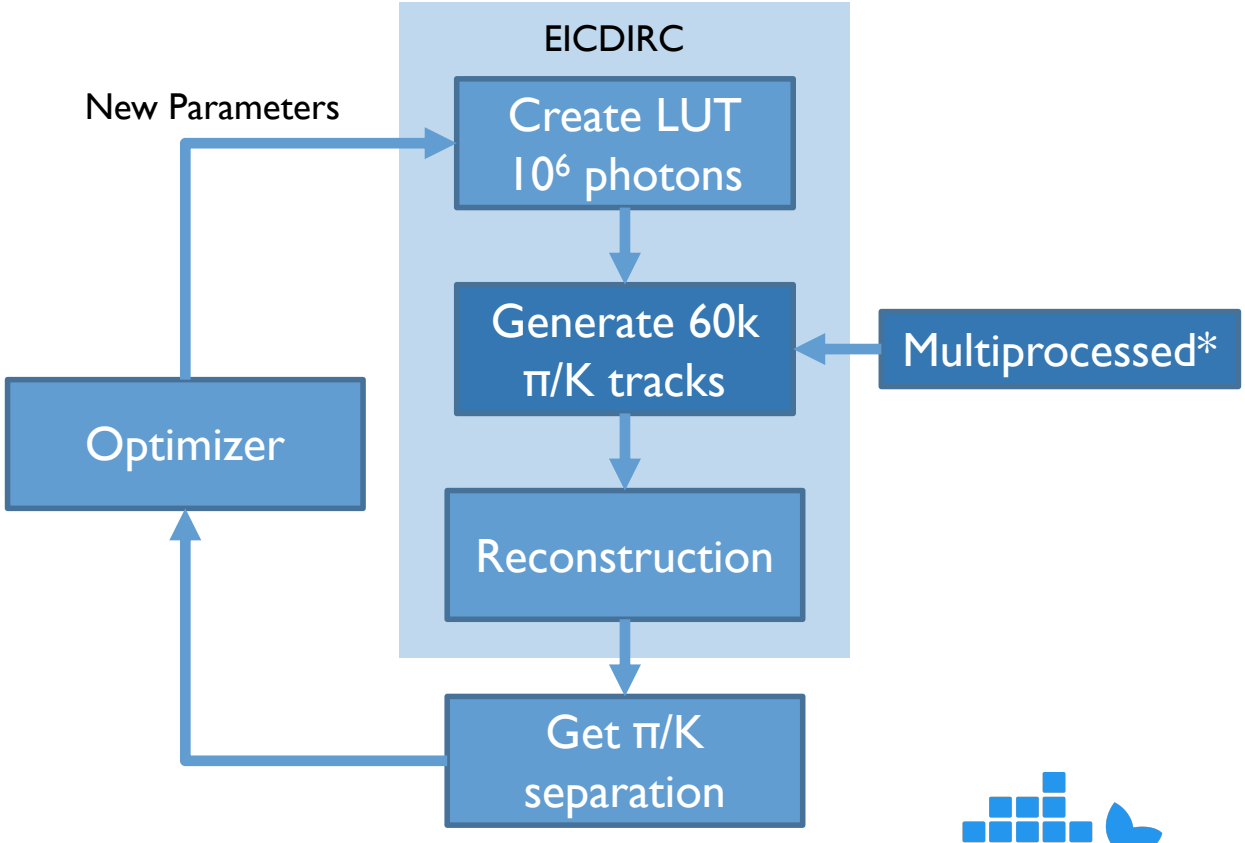
https://github.com/rdom/eicdirc





Optimization

- Python-based package using Scikit Learn optimizers
- Some parts needed to be parallelized to make optimization feasible
- Multiprocessing w/Python allows us to scale to each system.
- Each iteration is ~10 minutes
- All in docker image for portability



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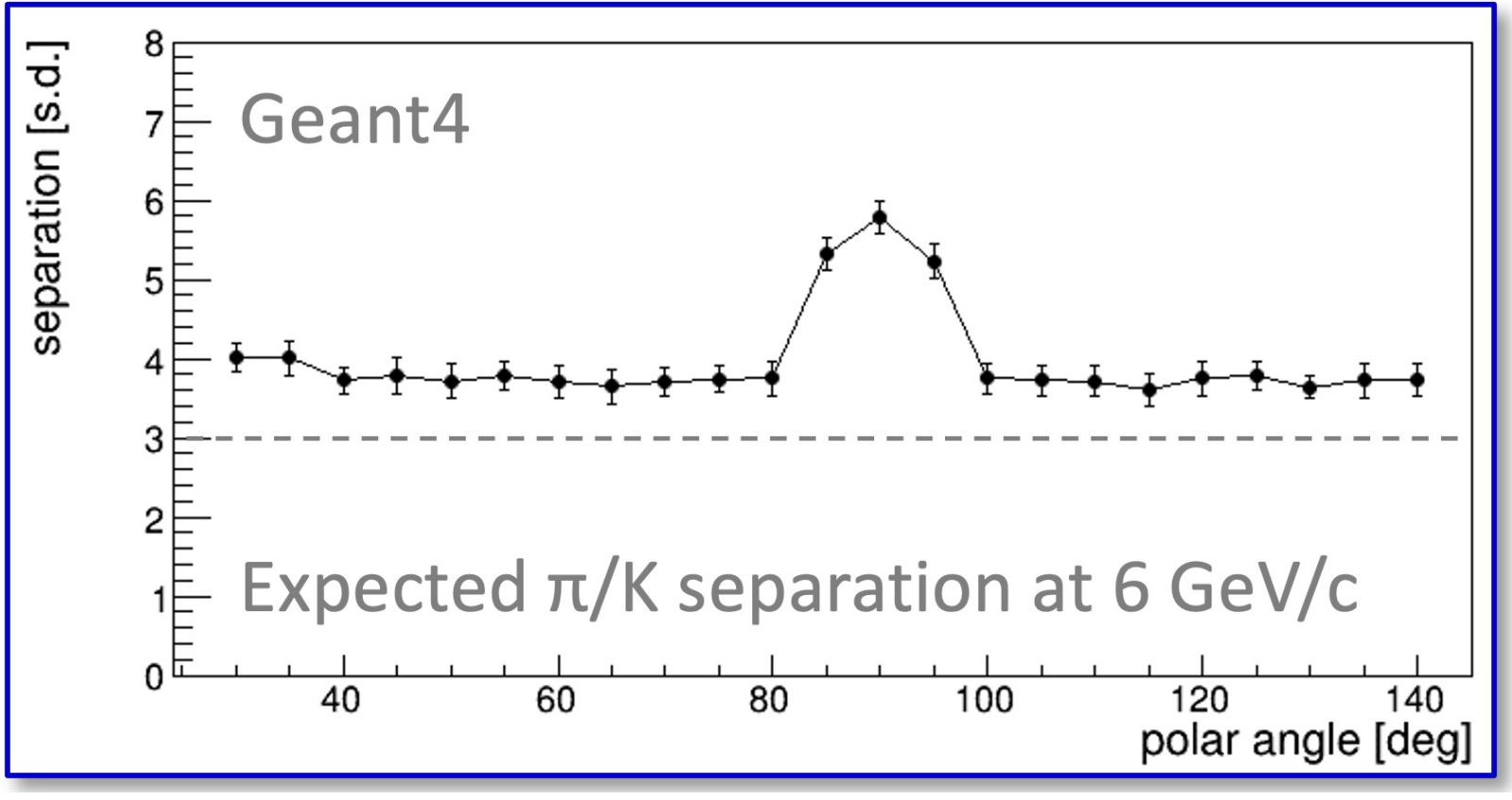
docker

Future work/Summary

- Optimization is feasible for the DIRC – We have shown that it is possible to get each iteration down from several hours to ~10 minutes
- We have performed an initial Grid search – low number of parameters until we clarified with the DIRC group
  - Results are very preliminary, will show results in future meeting!
- Next we will optimize adding addition parameters:
  - Bar Width
  - Prism Depth
  - Lens Radii
- We are making progress
  - Python framework/methods are applicable to other detector optimization projects

Questions?


Geant4
Expected π/K separation at 6 GeV/c
separation [s.d.]
polar angle [deg]
0
1
2
3
4
5
6
7
8
40
60
80
100
120
140