Fast Simulations (Plans) for CORE

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- Why?
- How?

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Why we need fast simulations

- The physics studies of the Yellow report relied heavily on fast simulations
- CORE has different geometry/detector technology than reference detector

➔Fast simulations of benchmark physics channels needed to validate performance

→e.g. how does KLM work for jets, JB method..

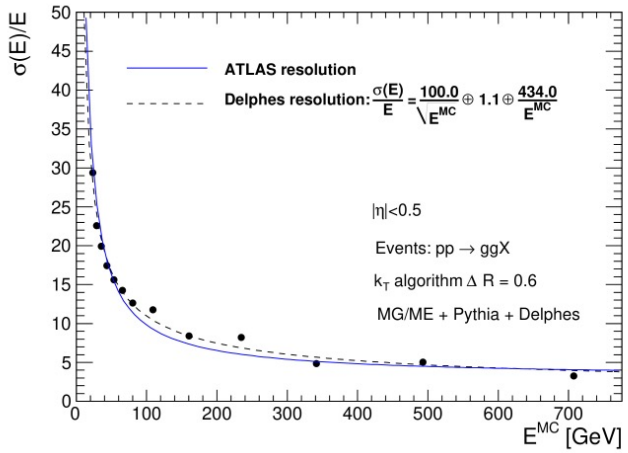
How?

- During YR report processes mainly two fast simulation packages were used
  - EICSmear (→see Kolja's talk) direct or within escalate
  - Delphes
- Both frameworks are easy to setup, learn and use
- I advocate to use Delphes (exclusively)
  - Support only one framework to optimize disk/CPU usage

- Advantages of Delphes
  - Widely used
  - stable
  - Very good support
  - Object oriented
  - Easy to learn and use (e.g. gives 'combined' resolutions in physics objects)
  - Powerful and feature rich
    - Limited magnetic field propagation
    - Visualization
    - Integration of jet algorithms/particle flow
    - Validation plots
    - …
- Introduction and use of Delphes for the EIC see S. Sekula's talk here: https://indico.bnl.gov/event/9062/contributions/40123/attachments/29762/46419/Sekula_2020-07-31-DelphesGuide_2020-07-31.pdf

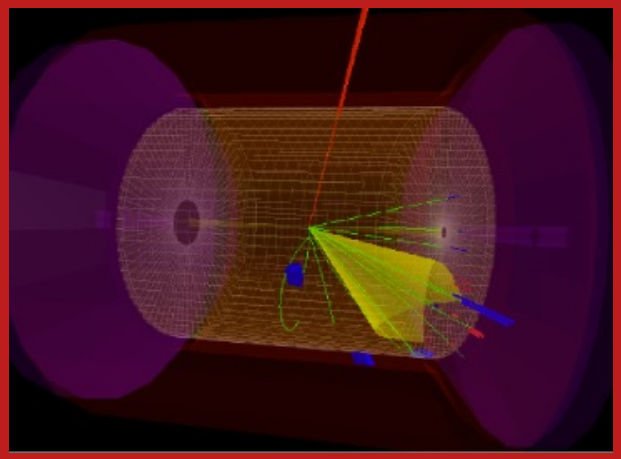
Some Examples

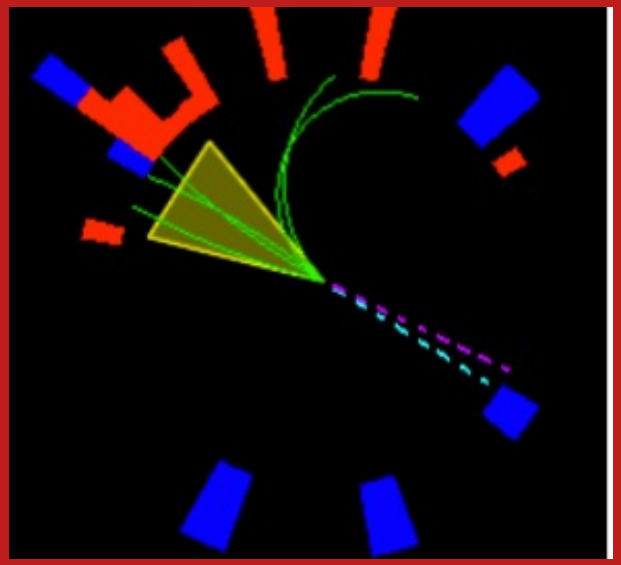
- Used in the YR for
  - Jet studies (M. Arratia, S. Sekula)
  - SIDIS di-hadron studies (A. Vossen)
  - Studies of event reconstruction from hadronic final state (A. Vossen)



S. Ovyn, X. Rouby, V. Lemaitre, : arXiV:0903.2225

Event Displays





From S. Sekula' talk

Plans and Outlook

- Duke has plans to implement the Delphes Geometry in Delphes over the summer
- Interest by others would be very welcome
- Significant people power will be needed to run validation suite
- Generating common simulation output files will lower hurdles to contribution significantly