

# Calorimeter Fast Sim

Kurt Hill

University of Colorado

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# Background

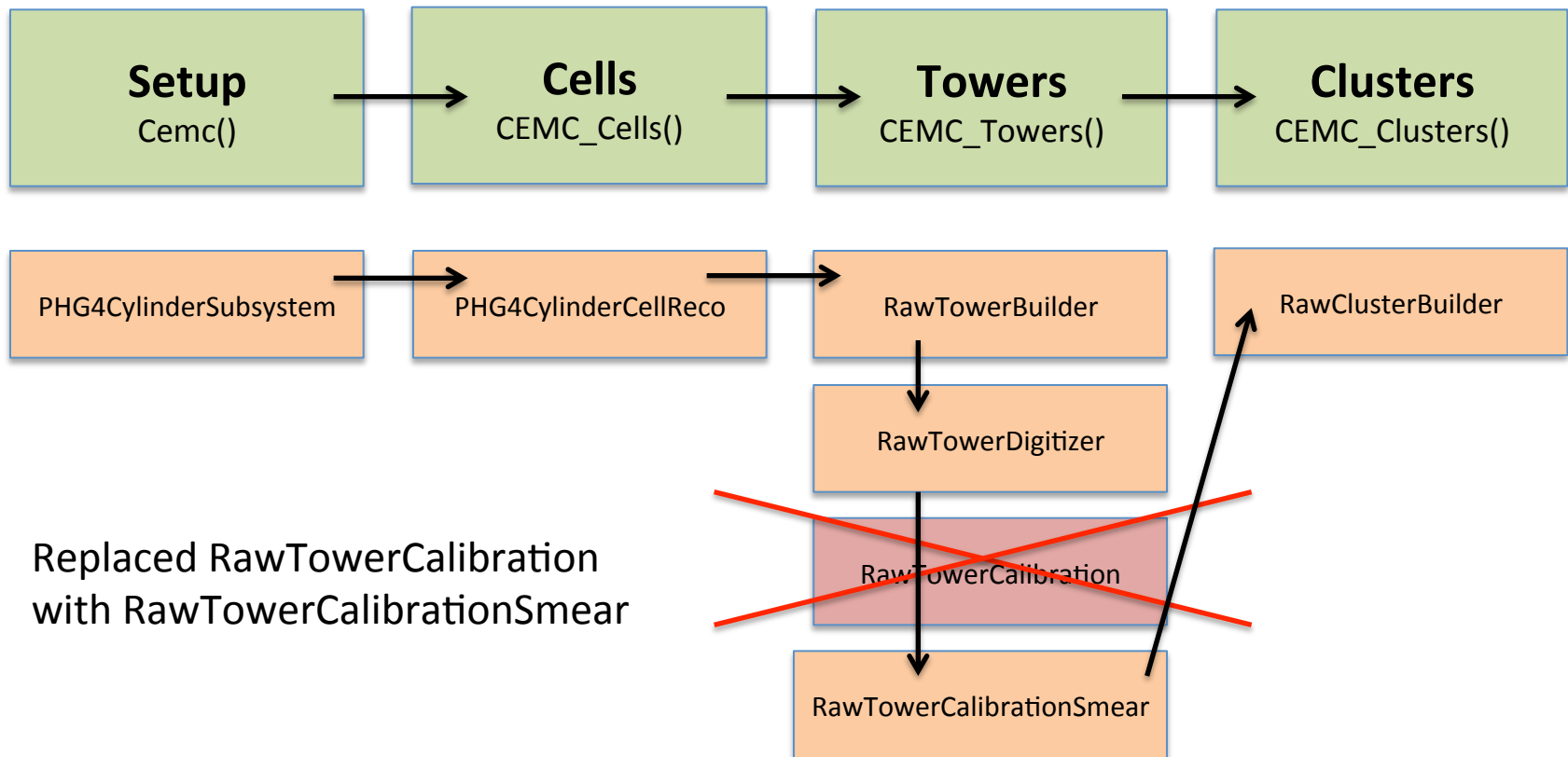
- We are testing different tracker configurations
  - Ultimately, want to quantify the impact on physics channels
  - Observe large fake rate when using ganged output in strip layers
- Want a fast sim of EMC and HCAL
  - Standard GEANT simulation of calorimeters is too slow
  - How much can fake rate be improved with use of calorimeter cuts?

# Where we are now

- Followed Jin's idea of replacing the EMCal with black hole material in a cylinder at 100cm
- Have a module that smears energy deposited, particle by particle
  - </direct/phenix+u/kurthill/sphenix/coresoftware/simulation/g4simulation/g4cemc/RawTowerCalibrationSmear.cc>
- Working towards getting smearing parameters from the G4 simulation of single particles through all of sPHENIX
- Have our own analysis module that looks at track (and calorimeter) objects
  - purity with and without calorimeter cuts
  - momentum and energy resolution, etc.
  - [Github.com/sPHENIX-Collaboration/analysis/SimpleTrackingAnalysis](https://github.com/sPHENIX-Collaboration/analysis/SimpleTrackingAnalysis)

# Smearing module description

EMCal Macro Chain:



# Next Steps

- Run single particle pions and electrons through full G4 simulation to obtain parameterizations for the smearing
- Compare full G4 simulation with fast sim in high multiplicity events