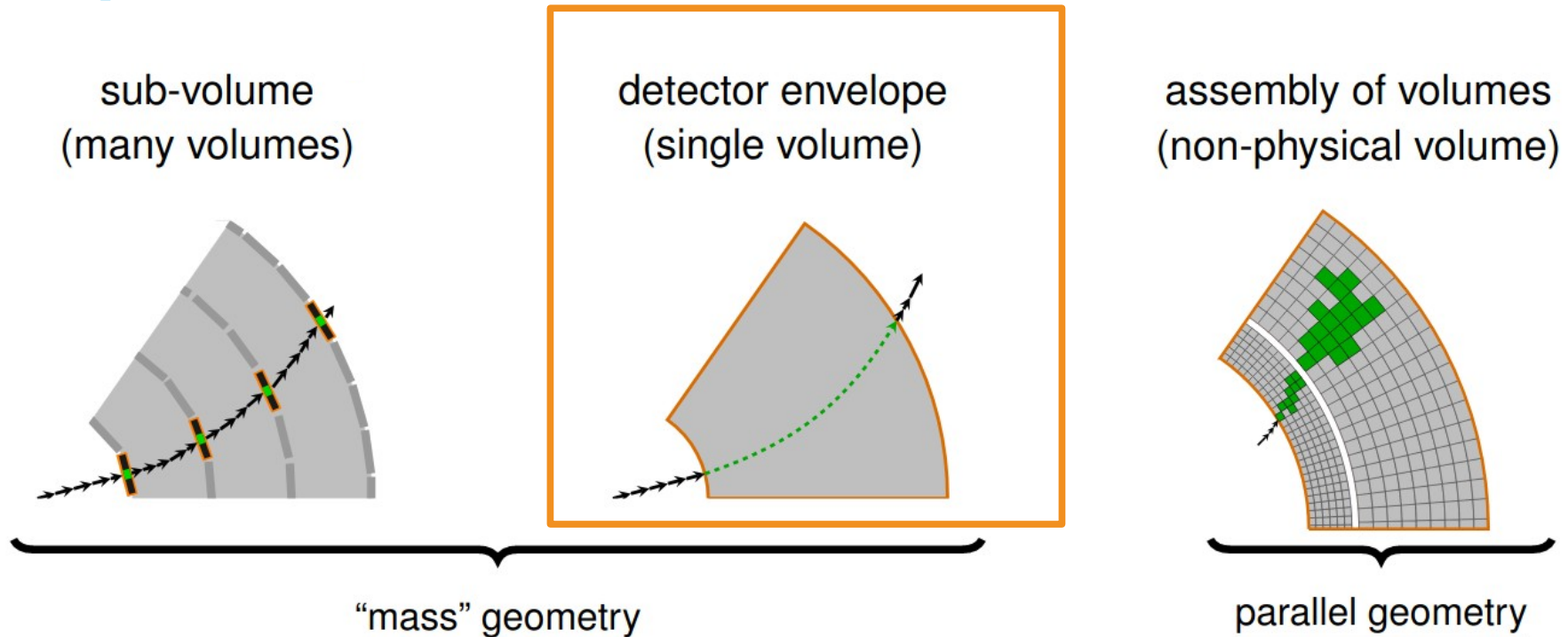


# GFlash Update and Problems With Angular and Energy conditioning

15.10.2021

# GFlash example



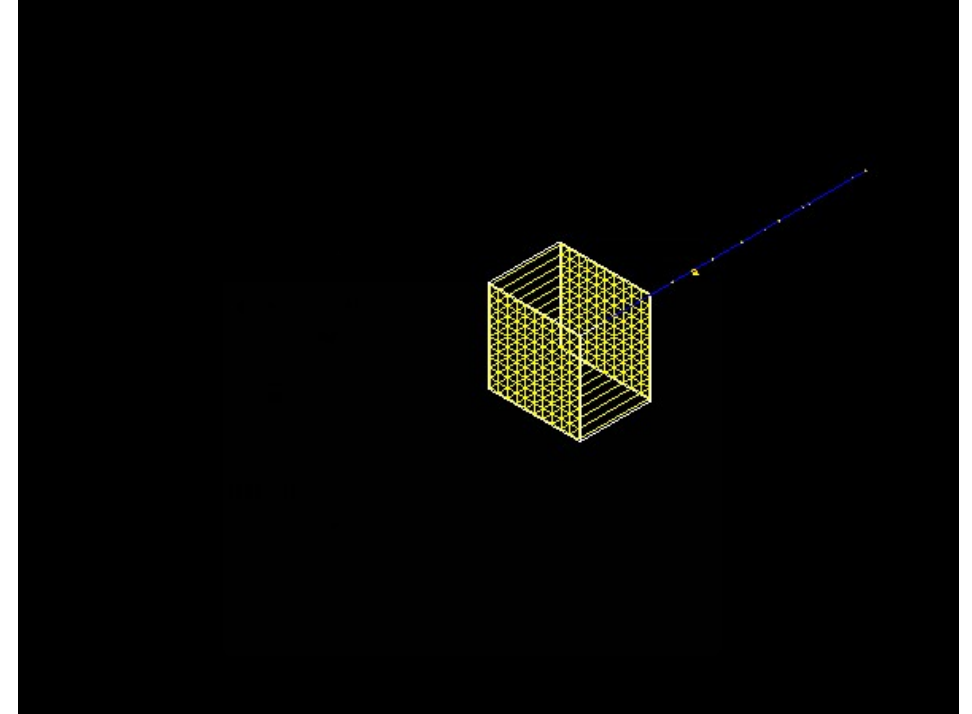
- FastSim hooks in Geant4 – define region in which GFlash will be used
- GFlash implementation of `G4VFastSimulationModel`
- Parameterisation attached to a `G4Region`

A. Zaborowska, Geant4 Advanced Course @CERN, 2020:

[https://indico.cern.ch/event/866056/contributions/3726143/attachments/2114291/3556913/G4\\_Course\\_fastSim\\_handout.pdf](https://indico.cern.ch/event/866056/contributions/3726143/attachments/2114291/3556913/G4_Course_fastSim_handout.pdf)

# GFlash example

- Gflash1 example is an implementation of Gflash for a 'CMS like' homogeneous ECAL- 10x10 PbWO4 crystals
- `GflashHomoShowerParameterisation`
- Readout is hardcoded in Geometry
- Now attempting `GflashSamplingShowerParameterisation`
- Building mock sampling calorimeter for testing



# A systematic approach to fixing Angle and Energy conditioning

- Sparsity
  - Add noise to 30x30x60
  - Cut data and train previous 30x30x40
- Statistics
  - 20-30GeV + 80-90deg
  - 50k, 25k, 5k
  - Attempted transfer learning
- Complexity
  - 20-30GeV + 80-90deg: converged
  - 10-40GeV + 80-90deg: did no converge
  - 19-20...GeV + 30-90deg: did not converge
  - Different networks
- HDR
  - Apply compression to Energies  $E^\alpha$
  - Does it prevent us learning distributions?- 1D toy model suggests not...