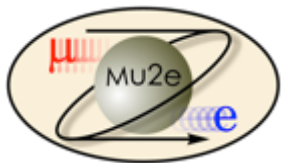


Calorimeter Software

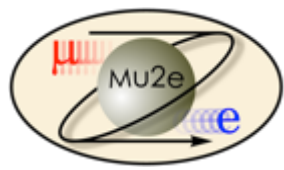
State of art

R.Donghia



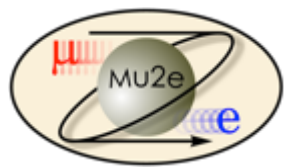
MUSE



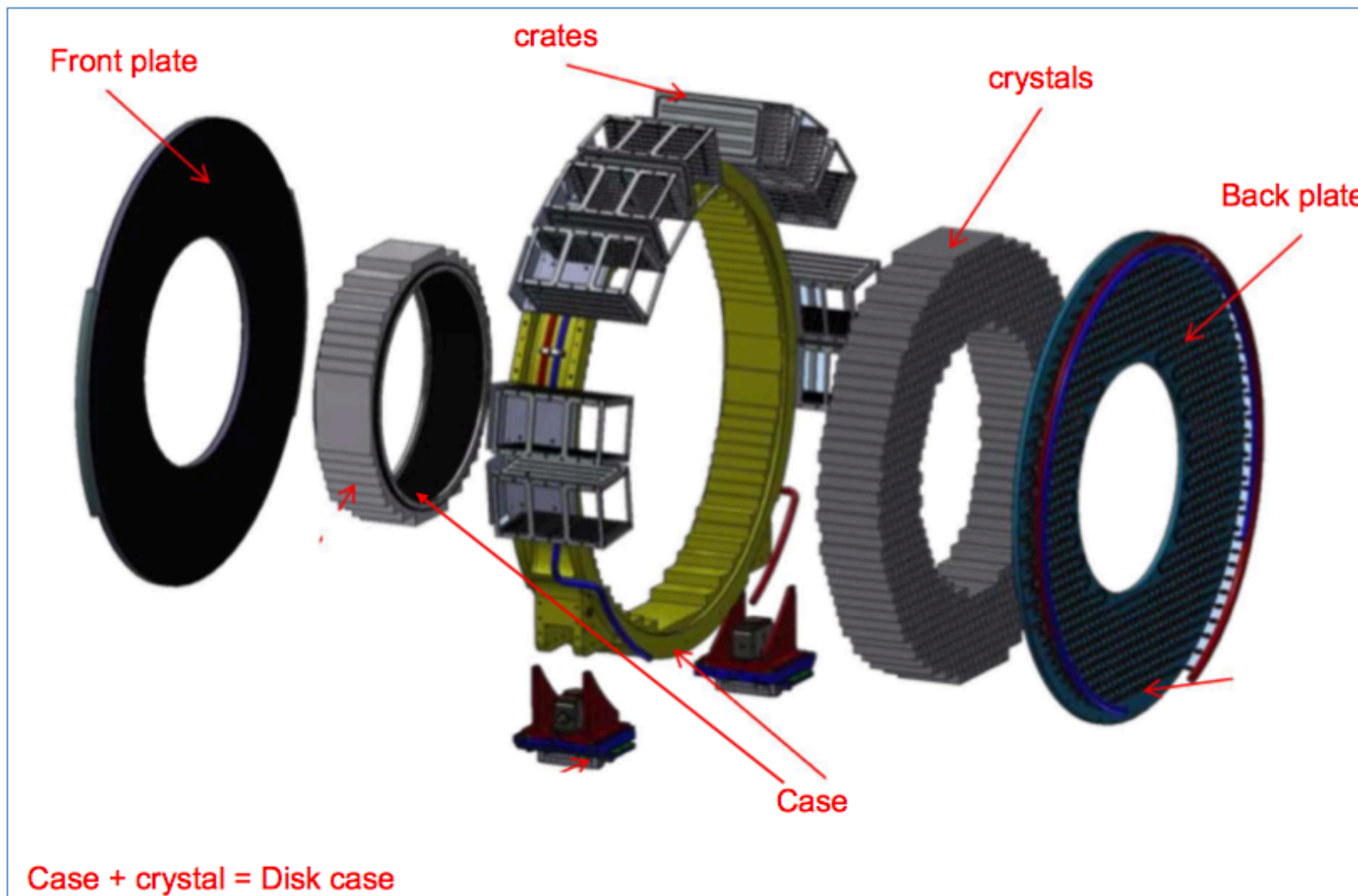


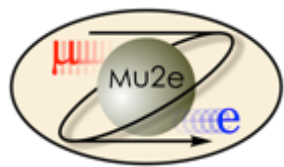
Main tasks

- Improve geometry description
- Dose estimation
- Integrate Module-0 Test Beam Data analysis



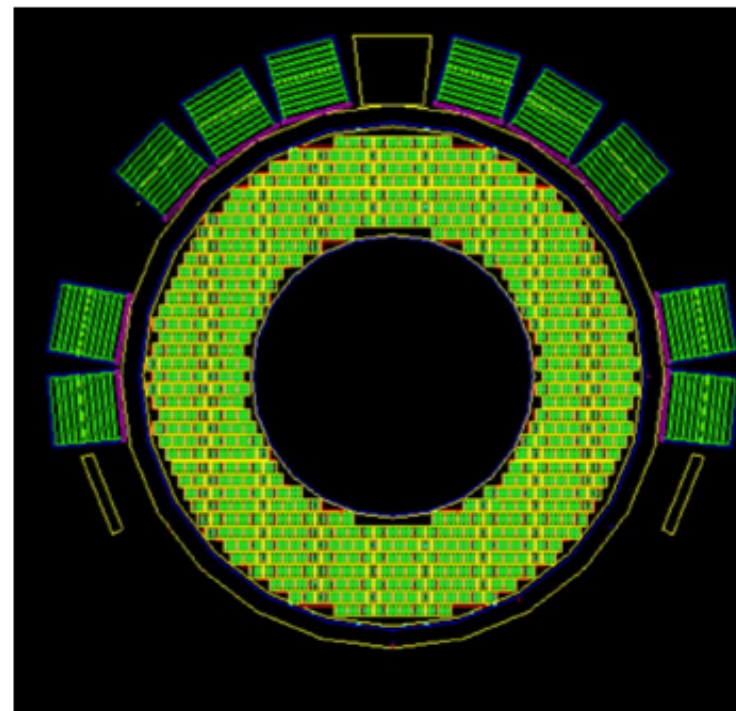
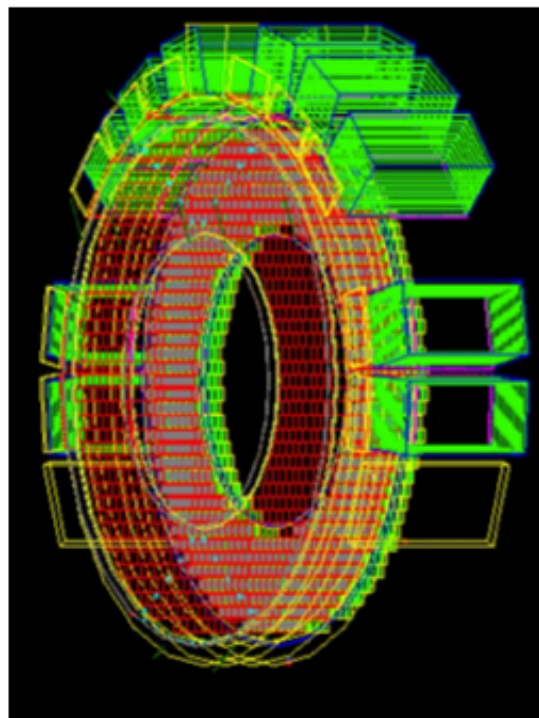
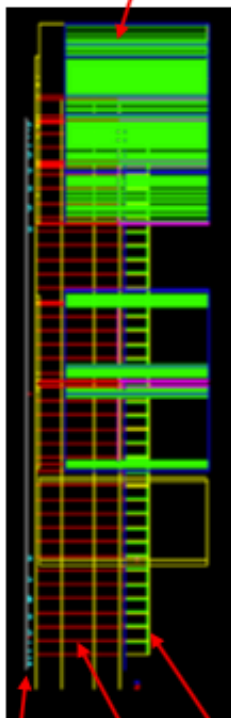
Actual geometry





Actual software geometry (1)

Crates



Front plate

Disk case

Back plate

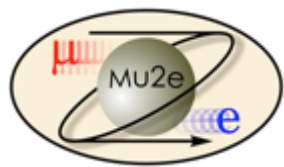
- **Front plate**: sandwich of 2 carbon fiber plates+ PET-like material

Pipe servicing not included

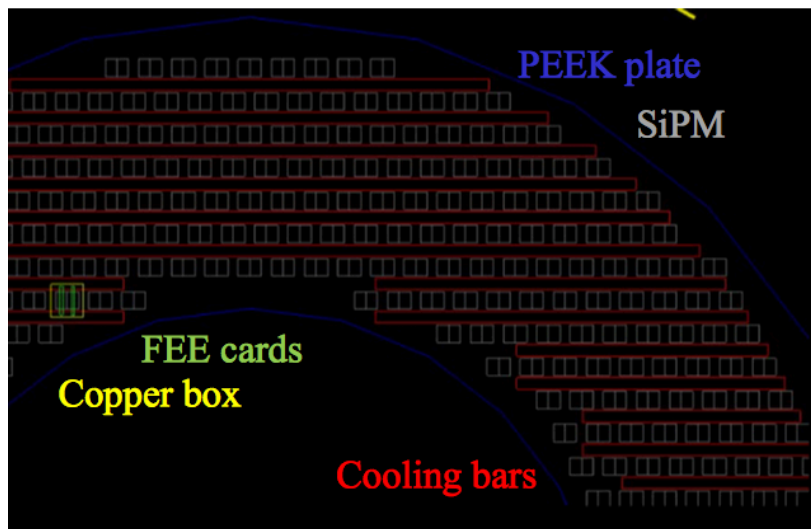
Need to verify dimensions and placement

- **Disk case**: inner ring, inner steps?, crystals, outer ring

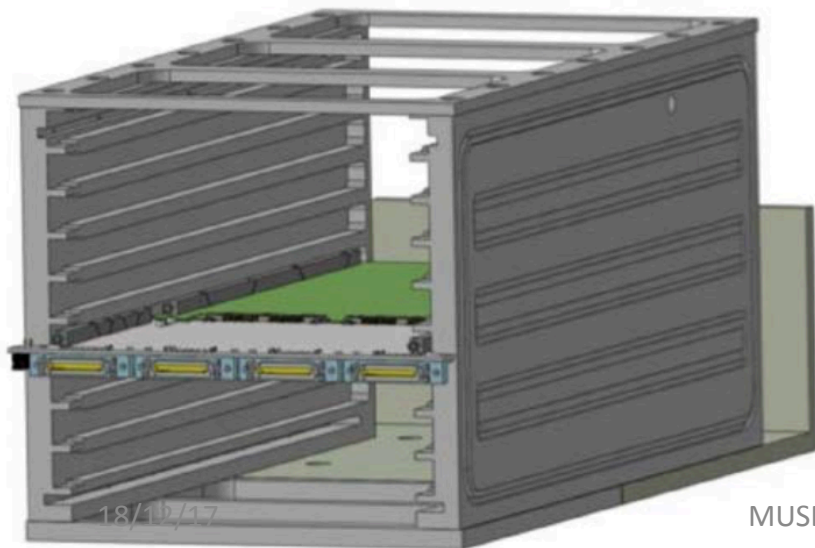
Feet, check dimension and placement of inner and outer ring and step



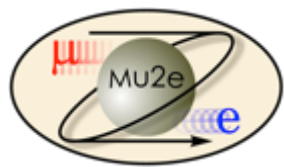
Actual software geometry (2) back plate



- **Back/FEE plate:** SiPM, PEEK plate, simplified cooling bars, FEE, copper box, manifolds
 - ❑ Cooling parts, SiPM holder...
More pieces = slower simulation
 - ❑ Need to verify dimensions and placement
- **Crates:** Crates panels, shielding, cards, cable services



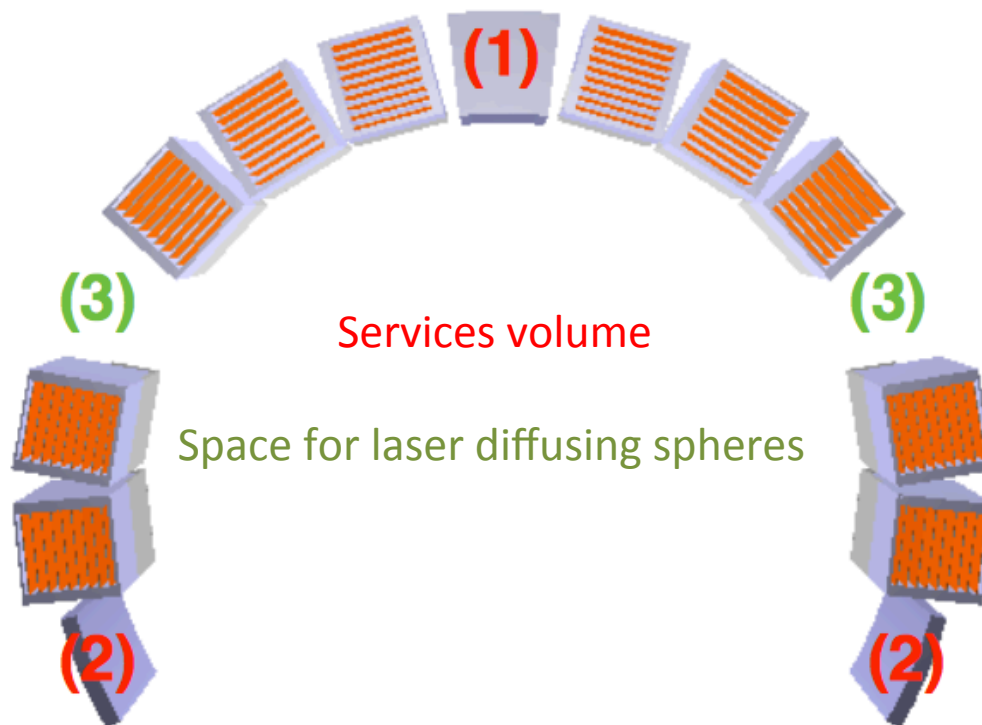
**All main components included
in the geometry!**



Crates Dose study

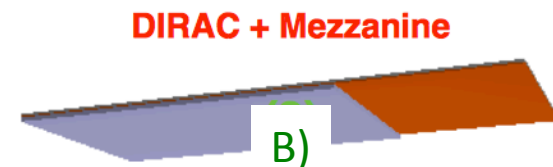
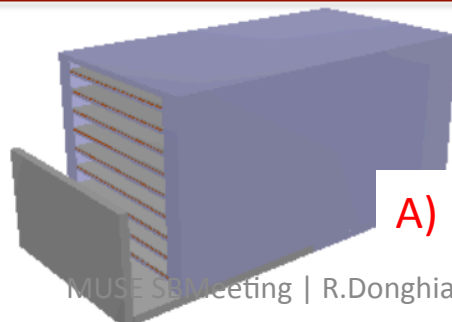
Dose on the calorimeter boards was updated using the latest geometry

- 9 boards/crate:
 - ➔ 8 DIRAC + mezzanine
 - ➔ 1 clock distributor

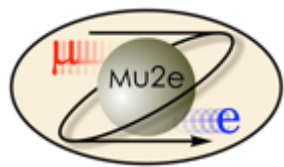


Shielding option

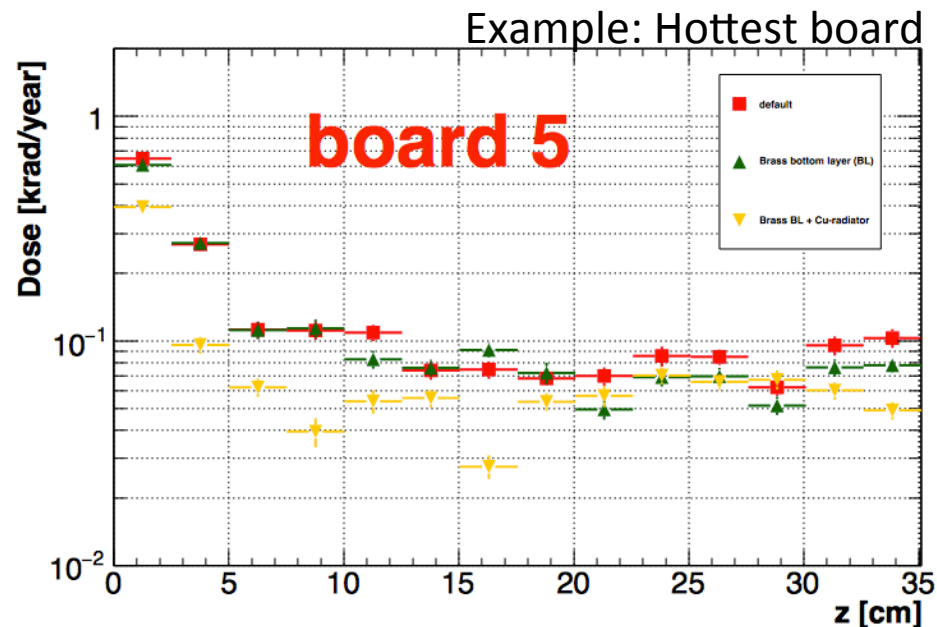
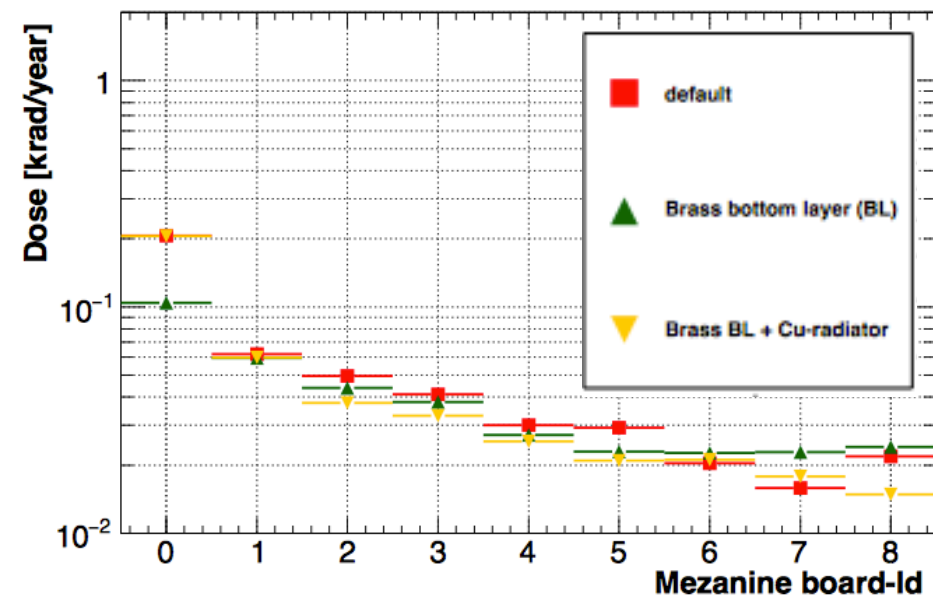
- A) Brass for the bottom layer
- B) Cu radiator instead of Al



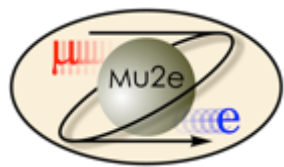
Only the DIRAC has the radiator!



Boards dose – Disk 0



- board-Id = 0 is the closest to the crystal volume
- Mean dose is below 0.2 krad/year
- Dose along the board can vary by a large factor (>2)
- Disk-1 mean dose < 0.3 krad/year (more photons on disk-1 from simulation)



Dose shield: CuW

Disk-0

- Edge effects on DIRAC boards disappeared
- Mezzanine dose doesn't show any change

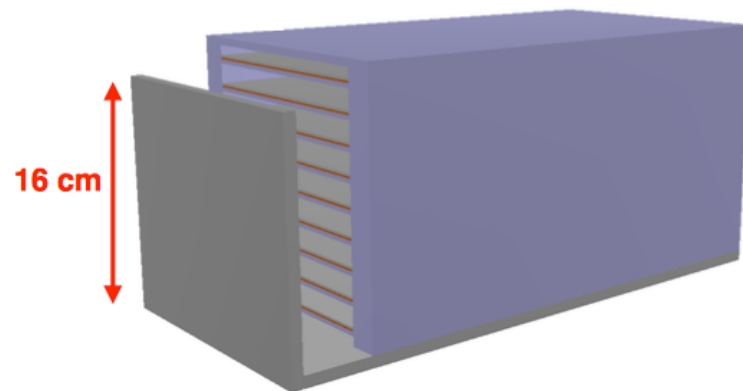
Disk-1

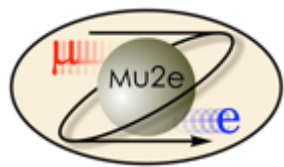
- Edge effects on DIRAC board disappeared
- Mezzanine dose doesn't show any change

Summary

Dose on the calorimeter boards was updated using the latest geometry

- 16 cm tall shield provides dose below 0.2 krad/year on disk 0: uniform
- the boards on disk 1 show regions with dose ~ 1 krad/year
- Mechanical engineer already started thinking of ways to implement 16 tall shield without interfering with board access
- Now we are focusing the attention to the crates on the second disk

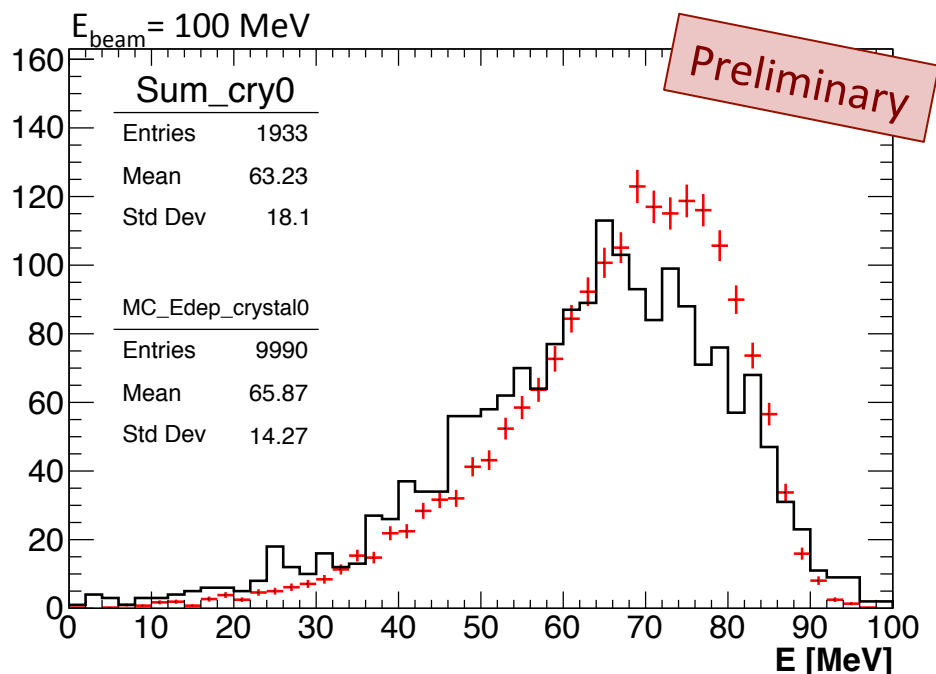




Module-0 TB

Mu2e Offline is also used to simulate the expected response of calorimeter prototypes

→ Module-0 tested @ BTF facility with e- beam (60-120 MeV)



- At the end of data analysis, the developed procedure will be integrated in the official Mu2e offline

