

On-line 21th AGATA Week

Commissioning Performance and Simulations Session

15th of March 2021

Implementing the new PRISMA reaction chamber in AGATA code

E. Gamba

on behalf of the “Agata at LNL Performance local WG”



F. Crespi
S. Bottoni
R. Pérez



The new expansion chamber

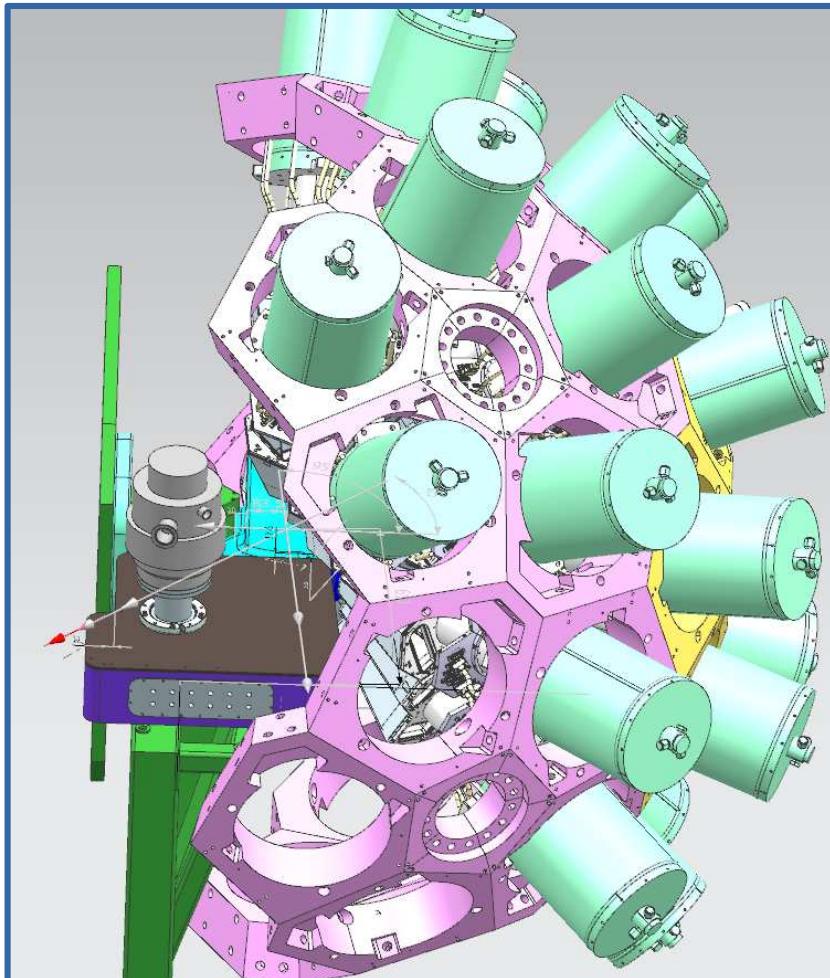


UNIVERSITÀ
DEGLI STUDI
DI MILANO



In planning stage at INFN Milano

- Needed to allocate the beam dump
- Needed to allocate cables from ancillary detectors



The new expansion chamber

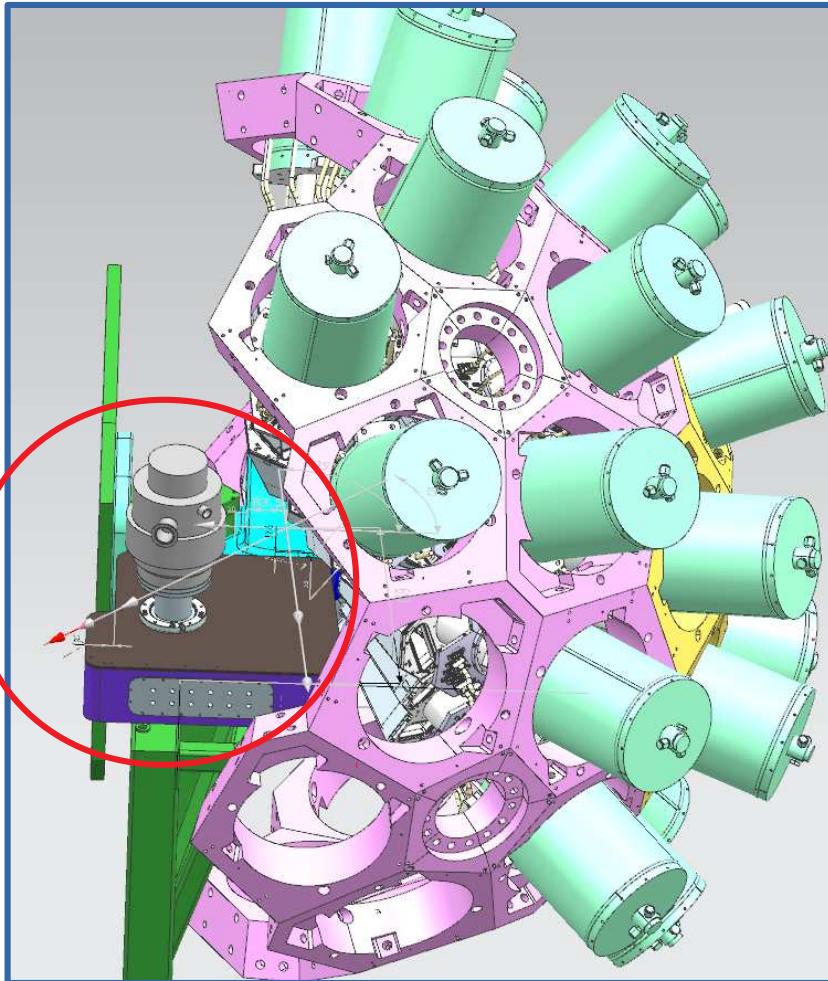
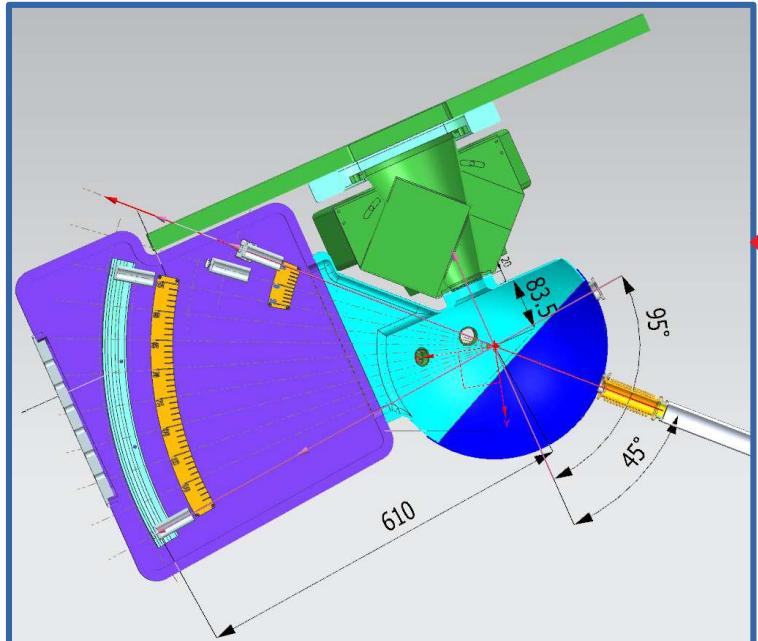


UNIVERSITÀ
DEGLI STUDI
DI MILANO



In planning stage at INFN Milano

- Needed to allocate the beam dump
- Needed to allocate cables from ancillary detectors



The new expansion chamber



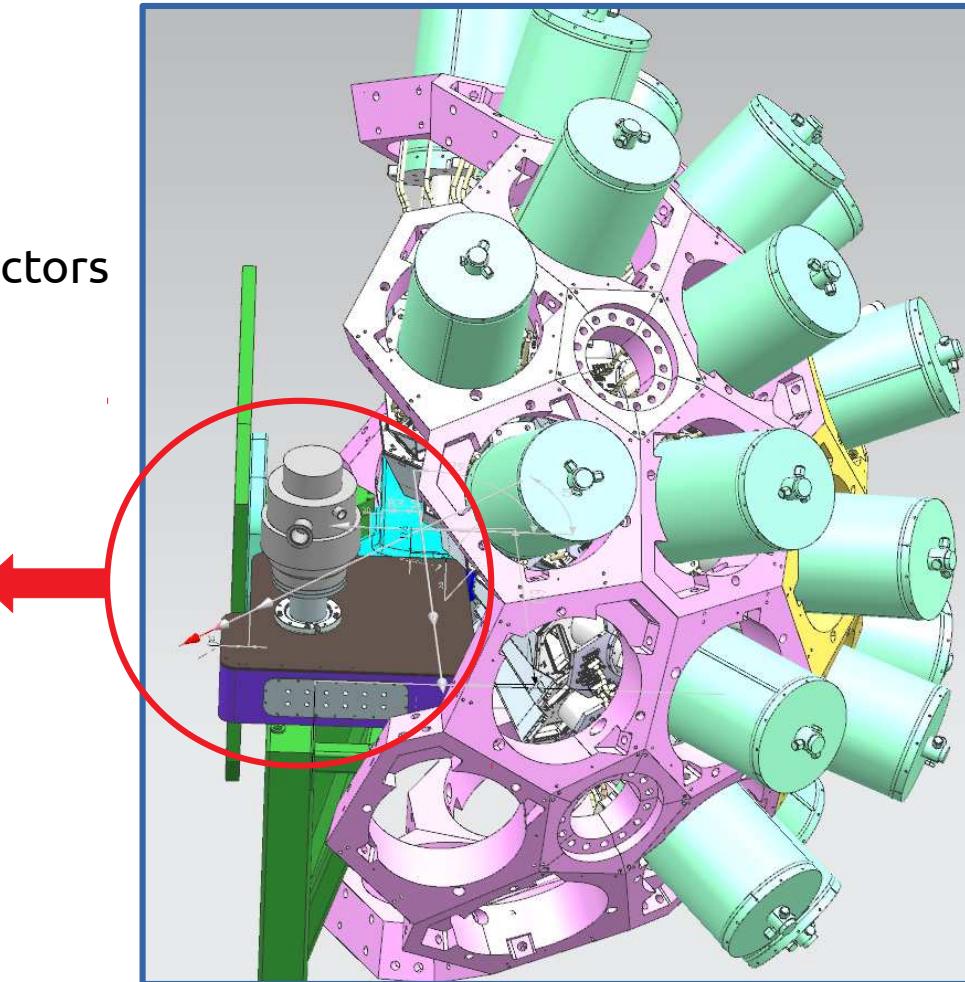
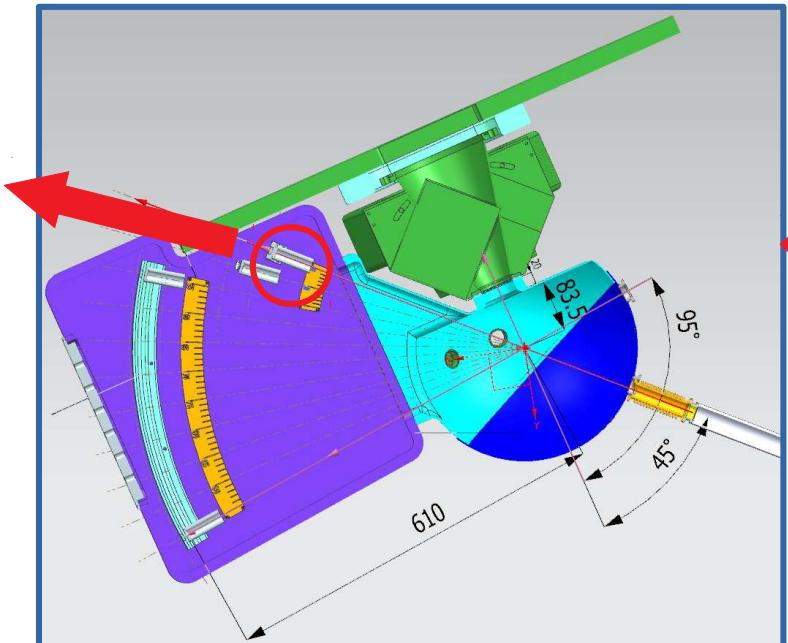
UNIVERSITÀ
DEGLI STUDI
DI MILANO

INFN
MILANO
Istituto Nazionale di Fisica Nucleare
Sezione di Milano

In planning stage at INFN Milano

- Needed to allocate the beam dump
- Needed to allocate cables from ancillary detectors

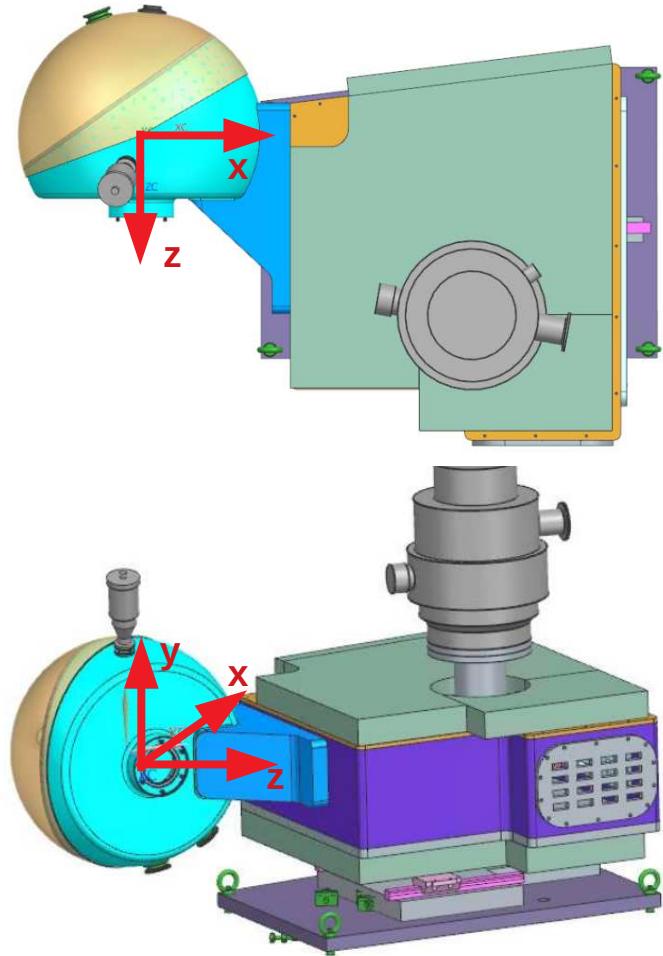
Movable
beam
dump
able to
cover the
angular
range
 45° - 95°



The new expansion chamber



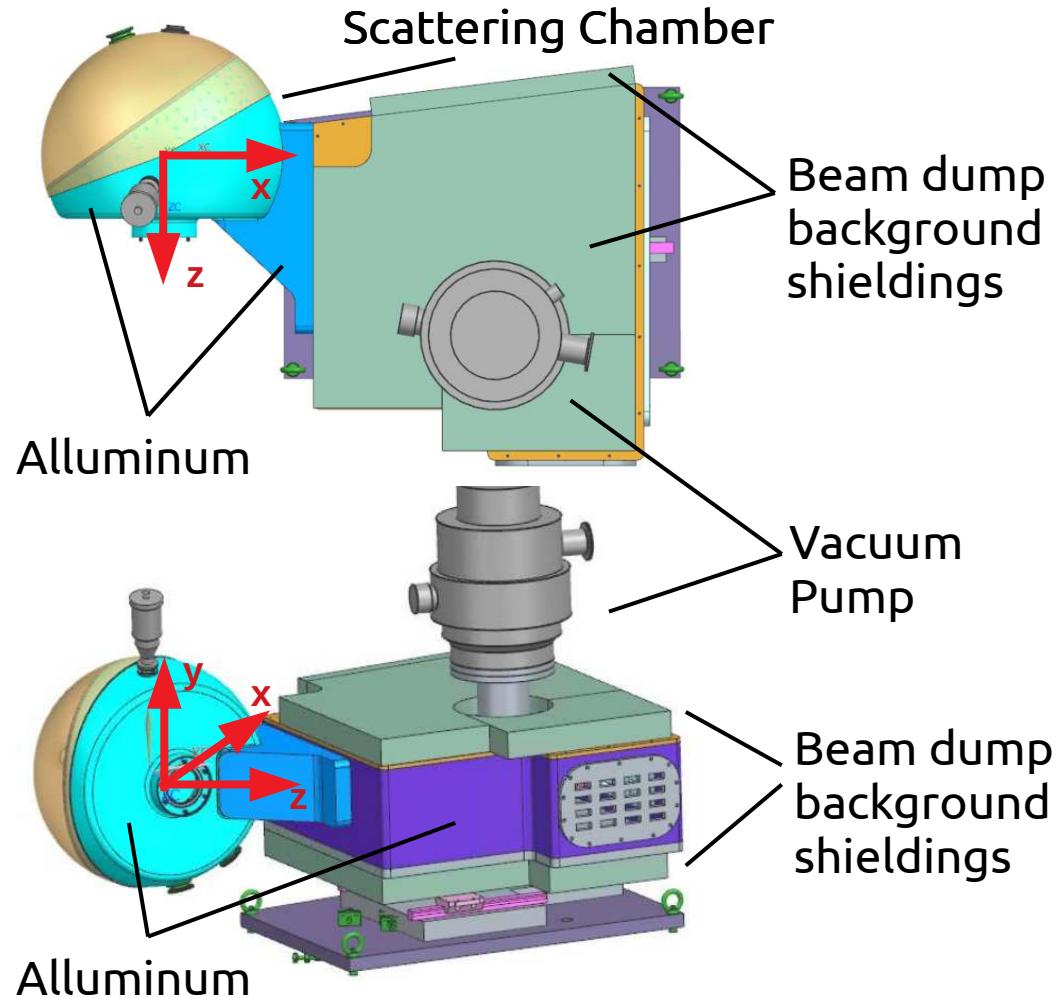
UNIVERSITÀ
DEGLI STUDI
DI MILANO



The new expansion chamber



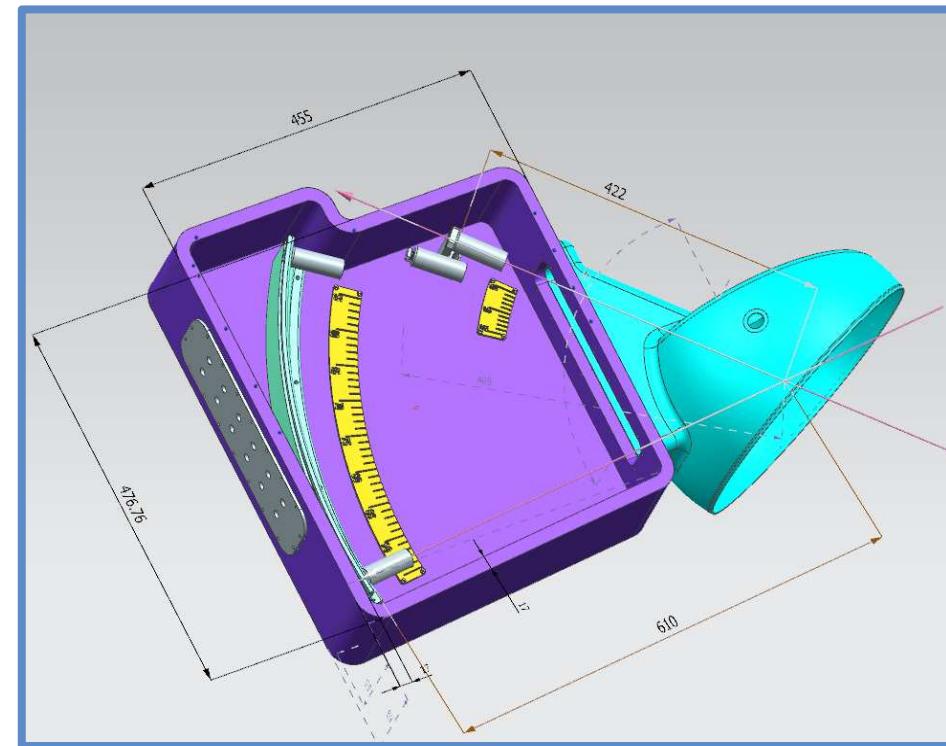
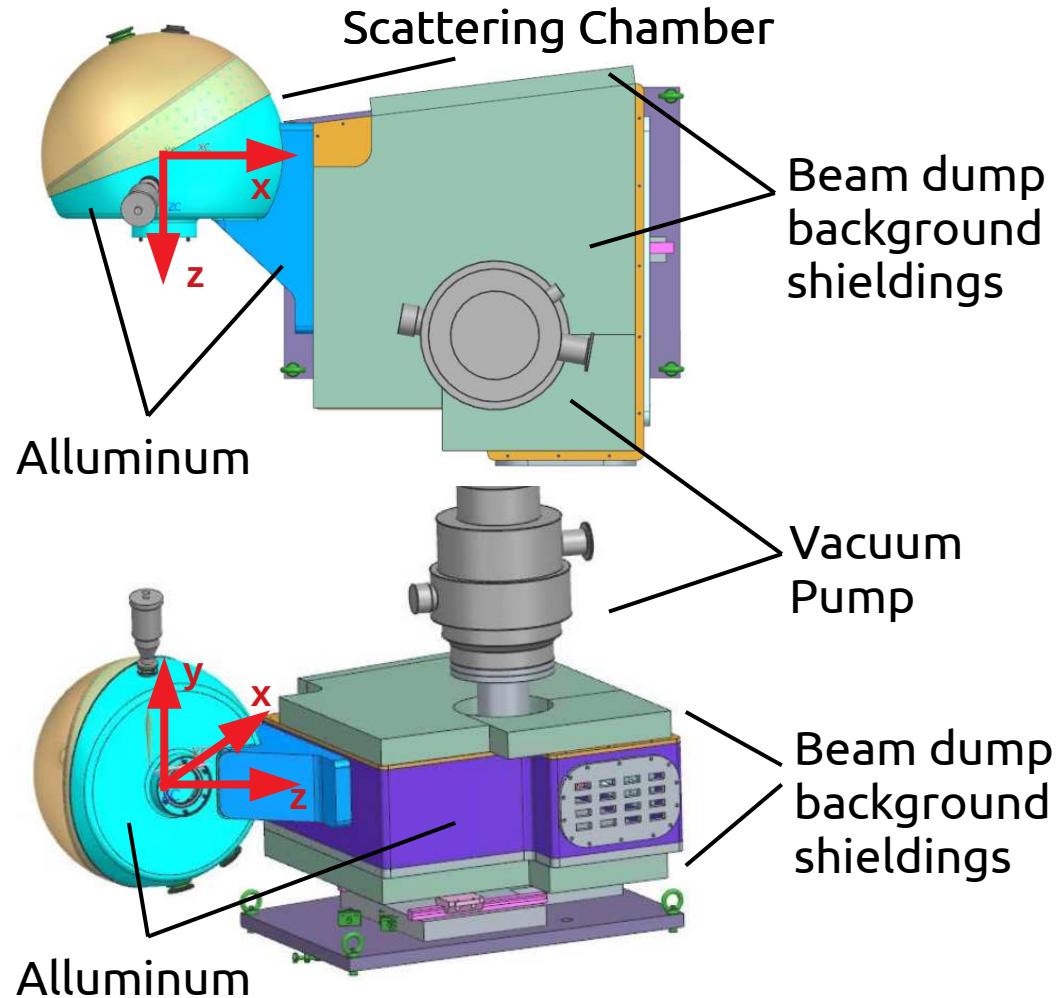
UNIVERSITÀ
DEGLI STUDI
DI MILANO



The new expansion chamber



UNIVERSITÀ
DEGLI STUDI
DI MILANO

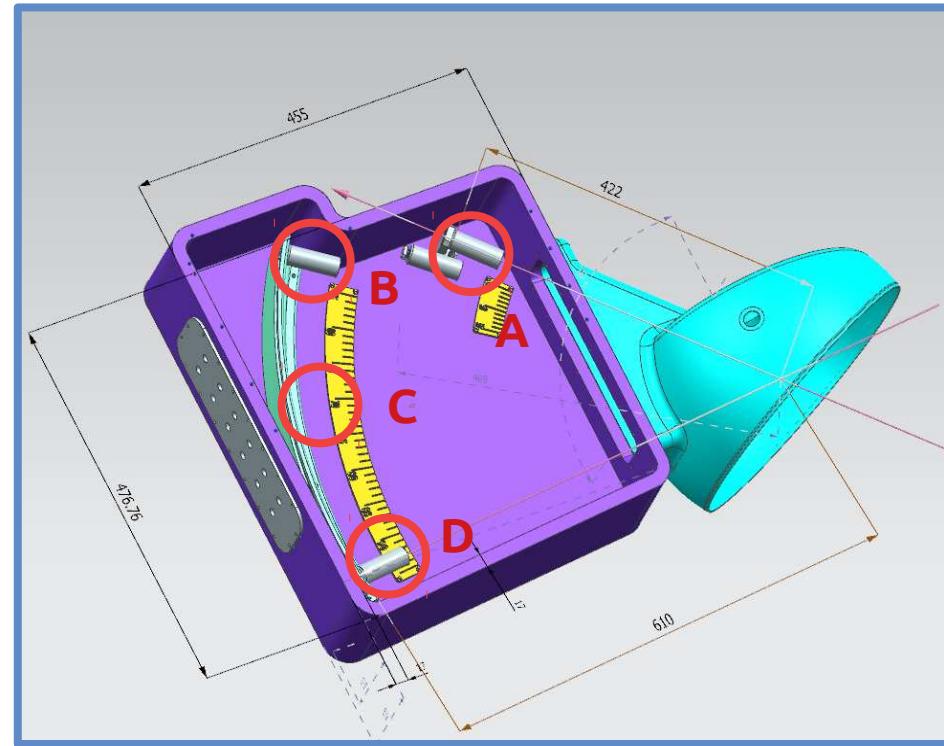
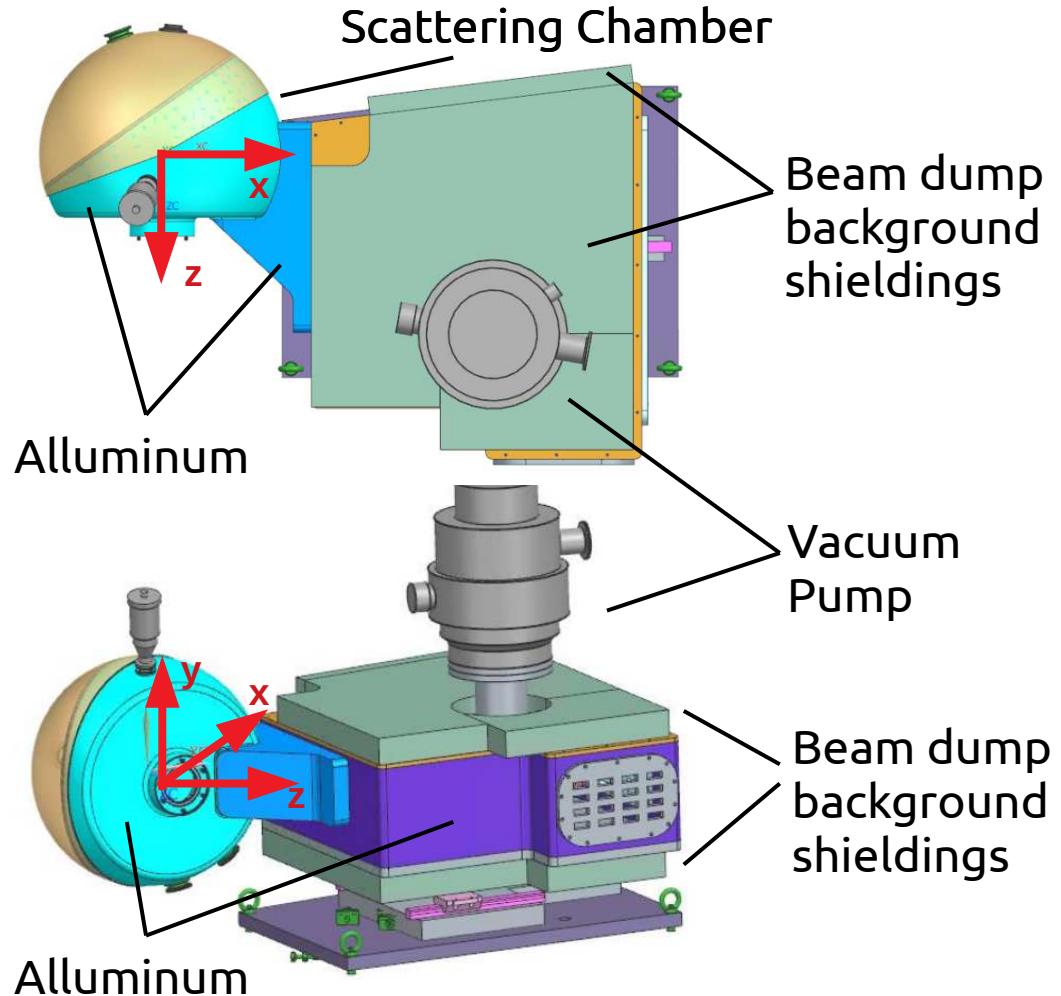


The new expansion chamber



UNIVERSITÀ
DEGLI STUDI
DI MILANO

INFN
MILANO
Istituto Nazionale di Fisica Nucleare
Sezione di Milano



Simulation of the absorption
given by different
thicknesses/materials at
different beam dump positions

GEANT4 implementation

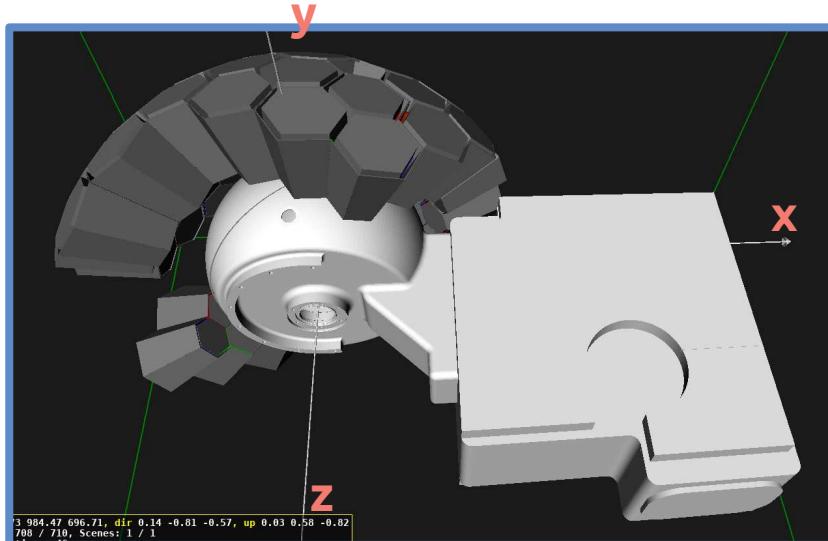


UNIVERSITÀ
DEGLI STUDI
DI MILANO



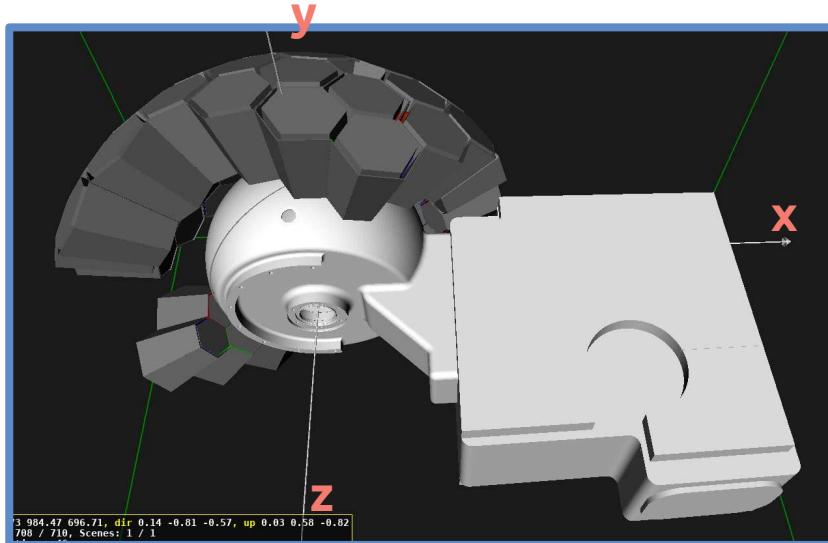
Conversion to from CAD file to stl using
Autodesk Inventor

Conversion to from stl file to step file
using the free software **cad2g4**



Conversion to from CAD file to stl using
Autodesk Inventor

Conversion to from stl file to step file
using the free software **cad2g4**



**Implemented as an ancillary
(passive) detector**

GEANT4 implementation

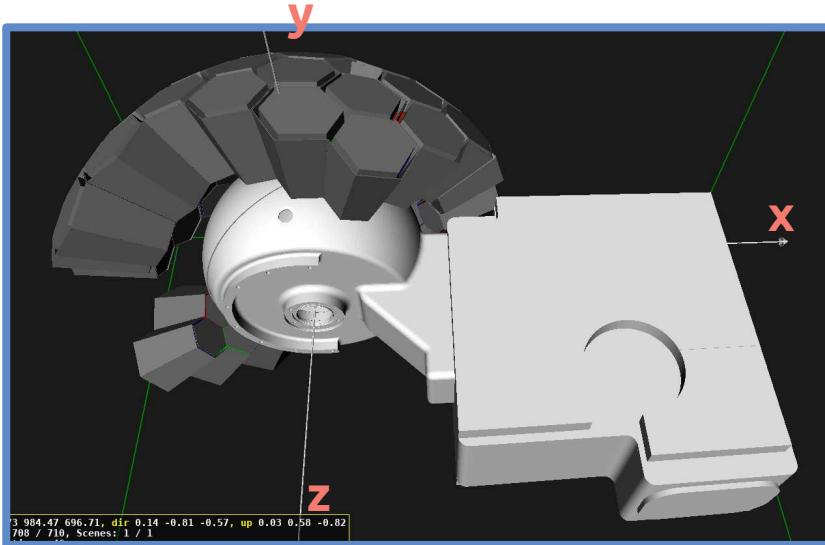


UNIVERSITÀ
DEGLI STUDI
DI MILANO

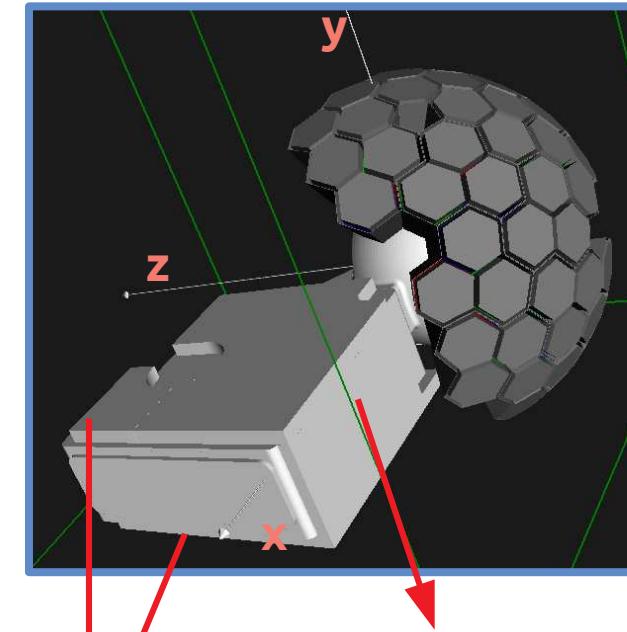


Conversion to from CAD file to stl using
Autodesk Inventor

Conversion to from stl file to step file
using the free software **cad2g4**



**Implemented as an ancillary
(passive) detector**



Always 25mm Hevimet
3 Thicknesses/Materials
Lead: 40 mm
Hevimet: 25 mm
Lead: 25 mm

GEANT4 implementation

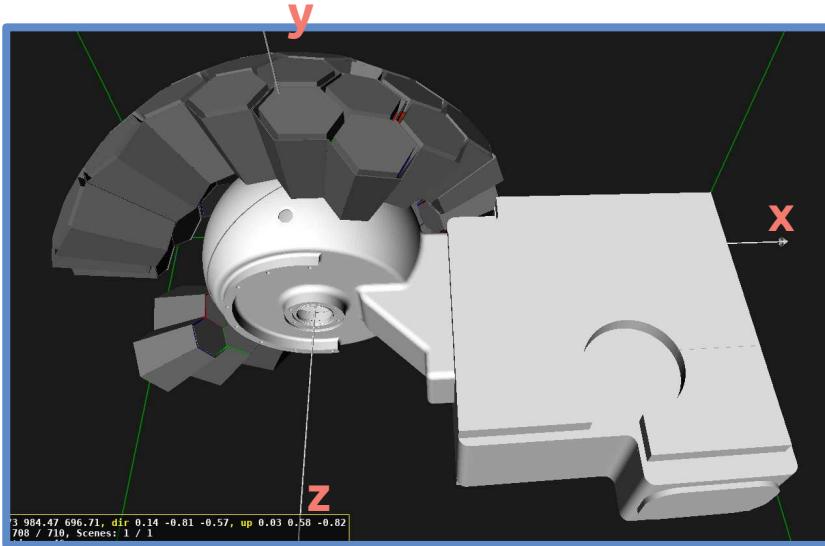


UNIVERSITÀ
DEGLI STUDI
DI MILANO



Conversion to from CAD file to stl using
Autodesk Inventor

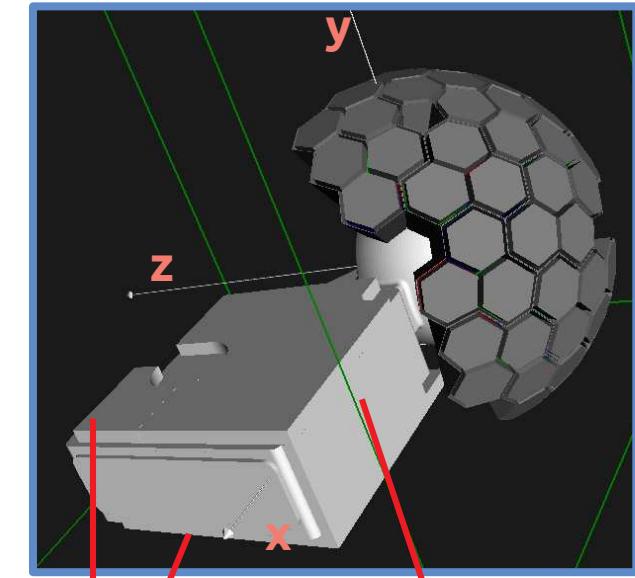
Conversion to from stl file to step file
using the free software **cad2g4**



**Implemented as an ancillary
(passive) detector**

3 Beam dump
positions

- A:** 292 292 mm
- B:** 505 340 mm
- C:** 597 188 mm
- D:** 609 21mm



Always 25mm Hevimet

3 Thicknesses/Materials

- | | |
|----------|-------|
| Lead: | 40 mm |
| Hevimet: | 25 mm |
| Lead: | 25 mm |

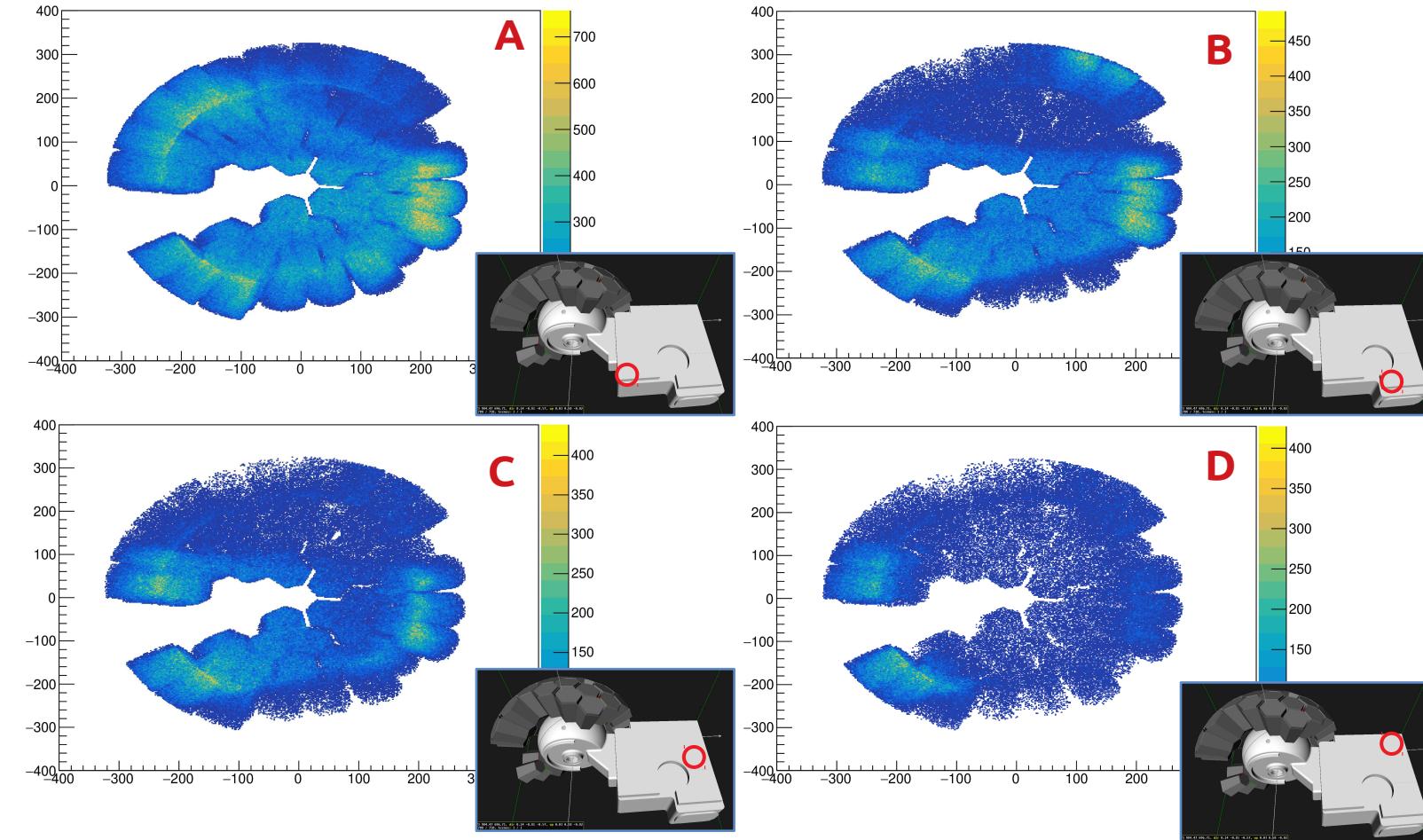
Effects of the shielding



UNIVERSITÀ
DEGLI STUDI
DI MILANO



Istituto Nazionale di Fisica Nucleare
Sezione di Milano



25 mm
Hevimet

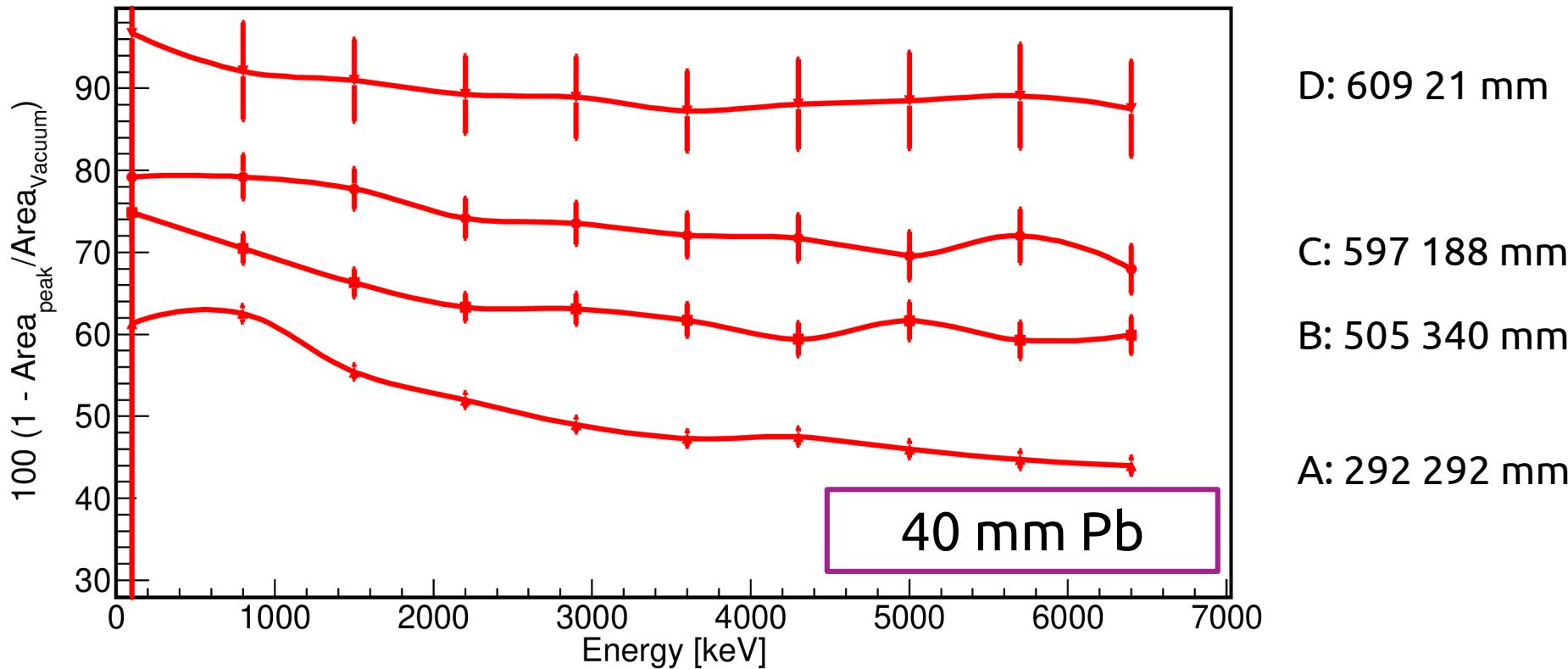
Effects of the shielding



UNIVERSITÀ
DEGLI STUDI
DI MILANO



Istituto Nazionale di Fisica Nucleare
Sezione di Milano



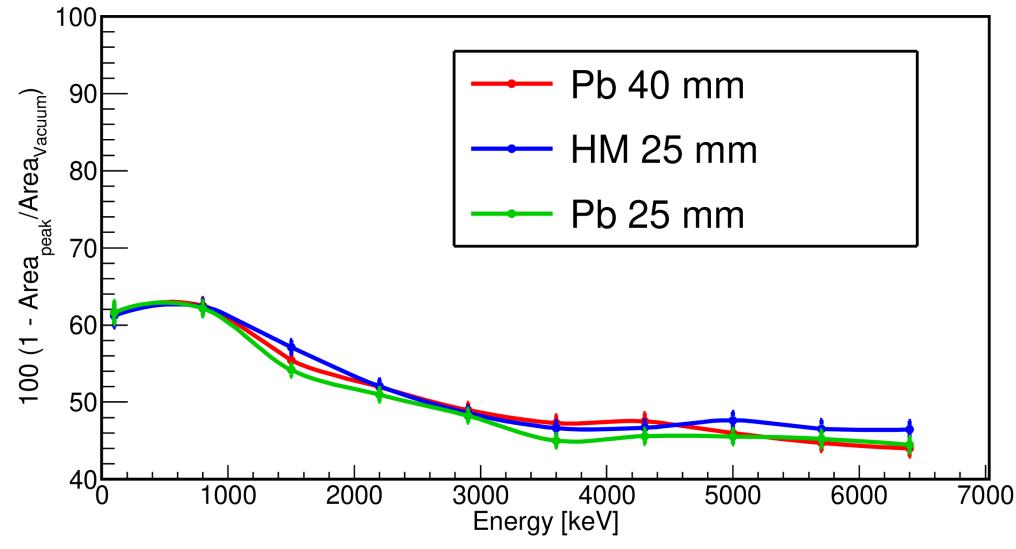
Effects of the shielding



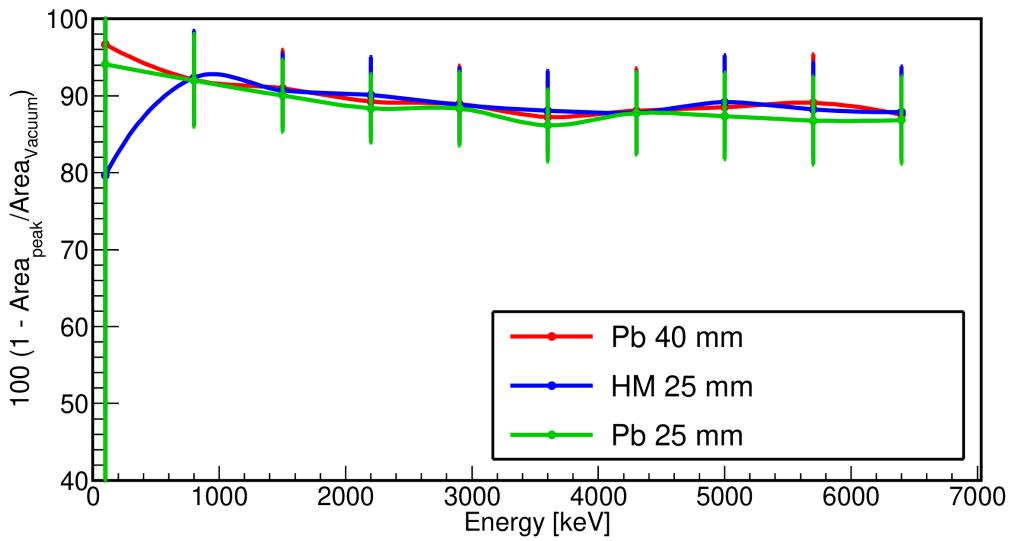
UNIVERSITÀ
DEGLI STUDI
DI MILANO



Istituto Nazionale di Fisica Nucleare
Sezione di Milano



D: 609 21 mm



A: 292 292 mm

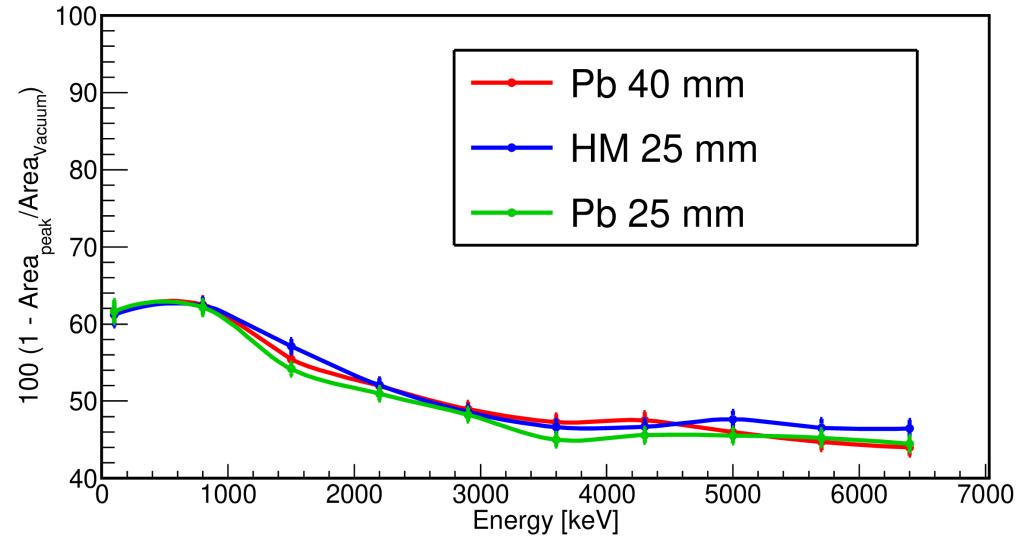
Effects of the shielding



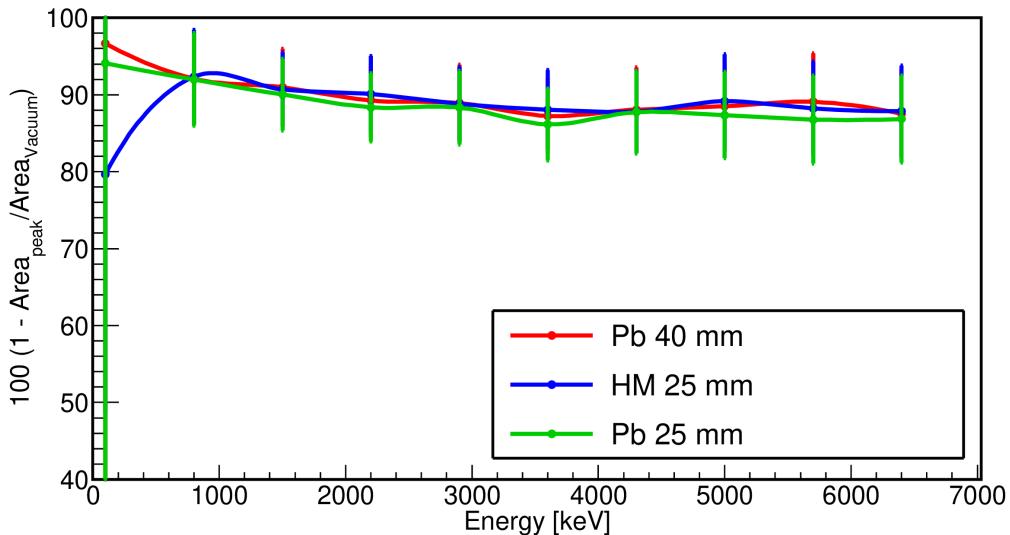
UNIVERSITÀ
DEGLI STUDI
DI MILANO



Istituto Nazionale di Fisica Nucleare
Sezione di Milano



D: 609 21 mm



A: 292 292 mm

40 mm Pb and 25 mm HM give similar results (as expected)

40 mm Pb and 25 mm Pb give similar results (not expected)

Geometrical reason?

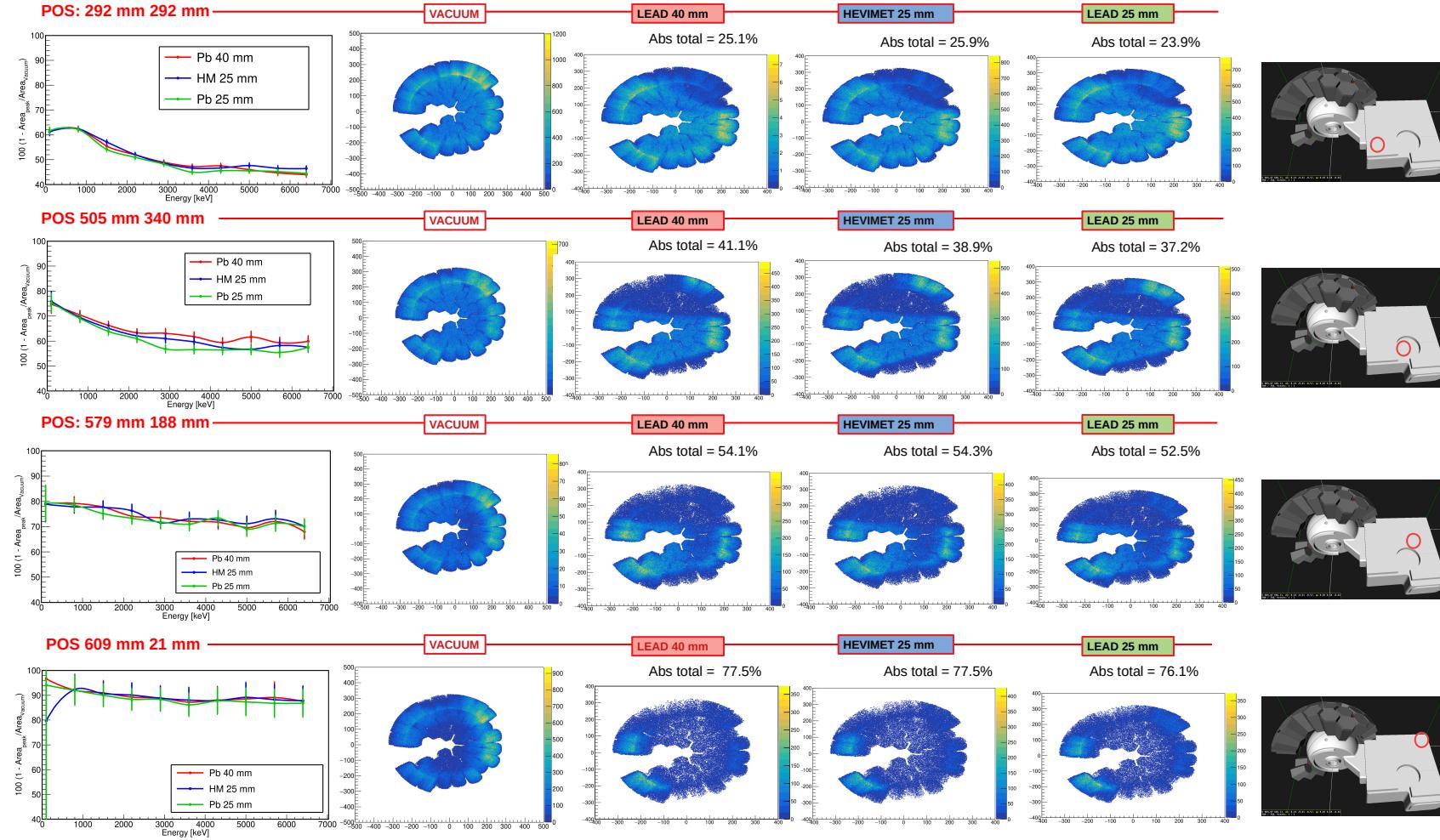


Check individual detectors

Effects of the shielding



UNIVERSITÀ
DEGLI STUDI
DI MILANO



40 mm vs 25 mm of lead shieldings: Pos. B

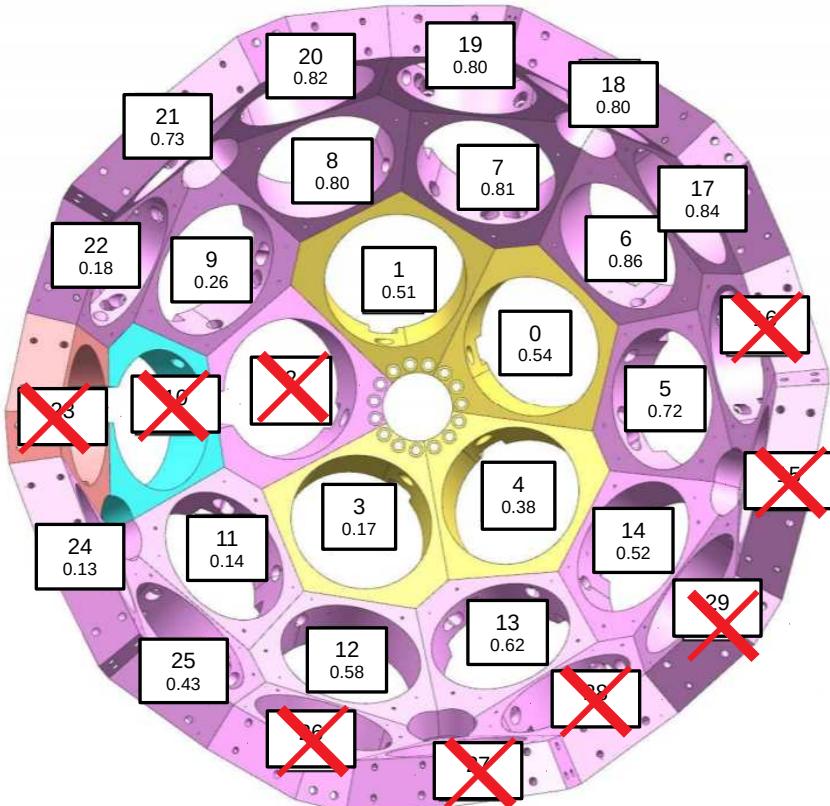
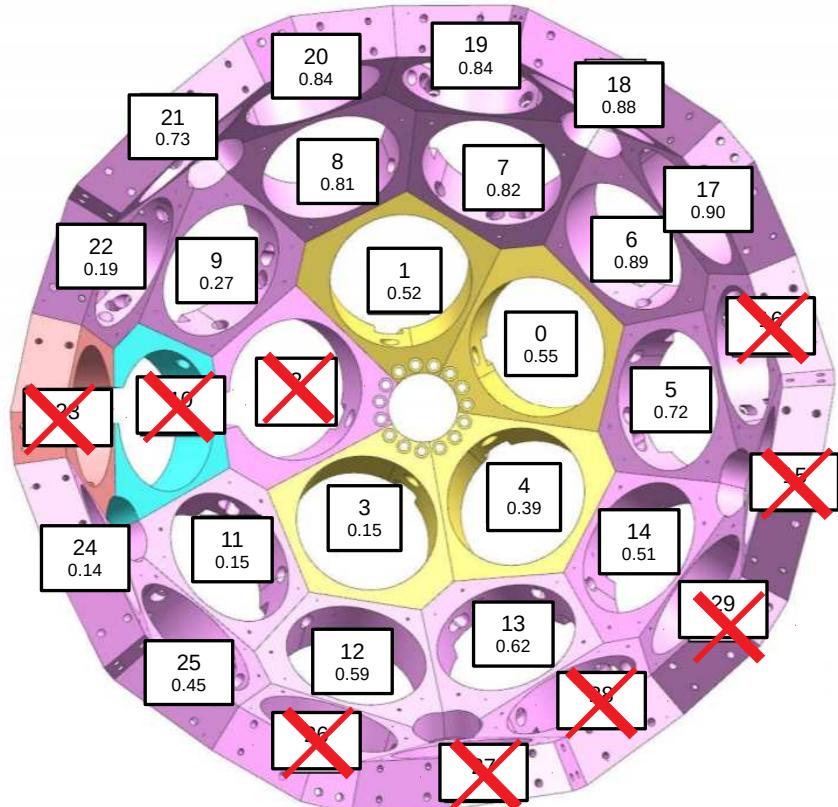


UNIVERSITÀ
DEGLI STUDI
DI MILANO



Istituto Nazionale di Fisica Nucleare
Sezione di Milano

Position B 579 188



40 mm vs 25 mm of lead shieldings: Pos. D

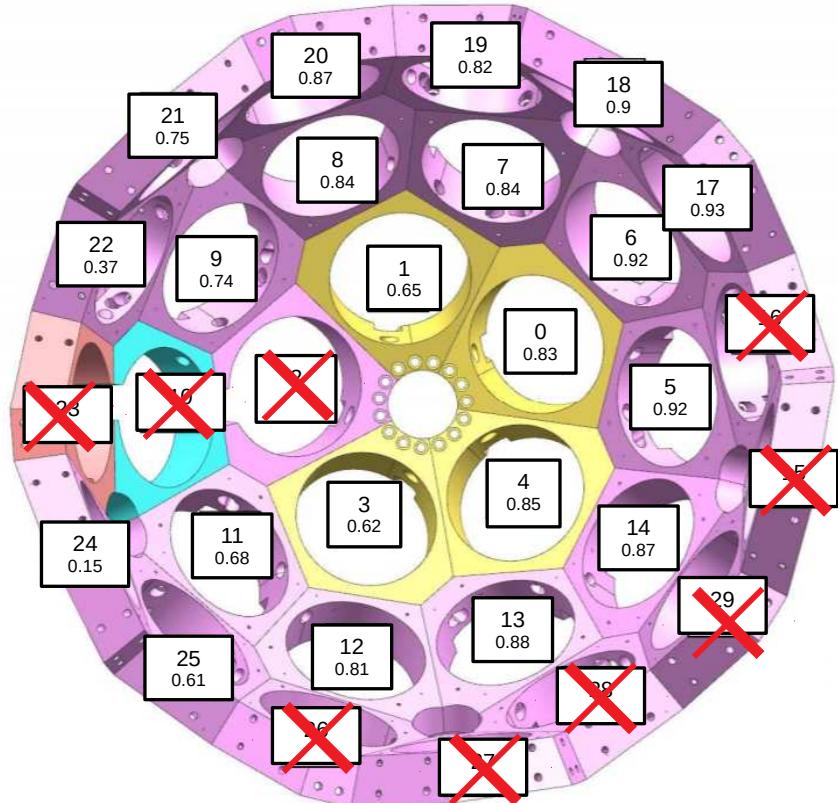


UNIVERSITÀ
DEGLI STUDI
DI MILANO

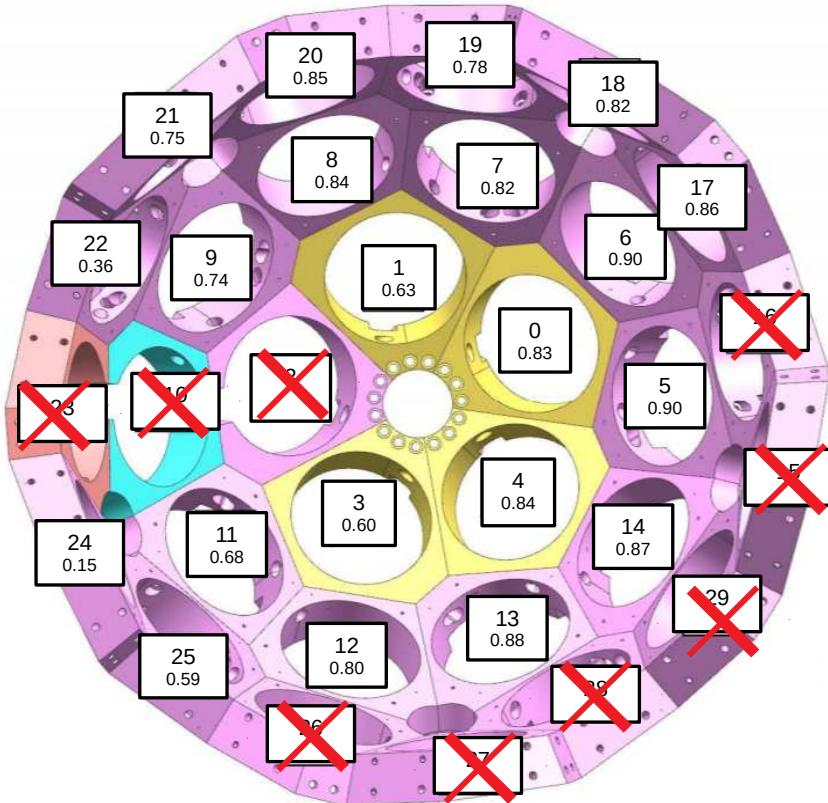


Istituto Nazionale di Fisica Nucleare
Sezione di Milano

Position D 609 21



Pb 40 mm

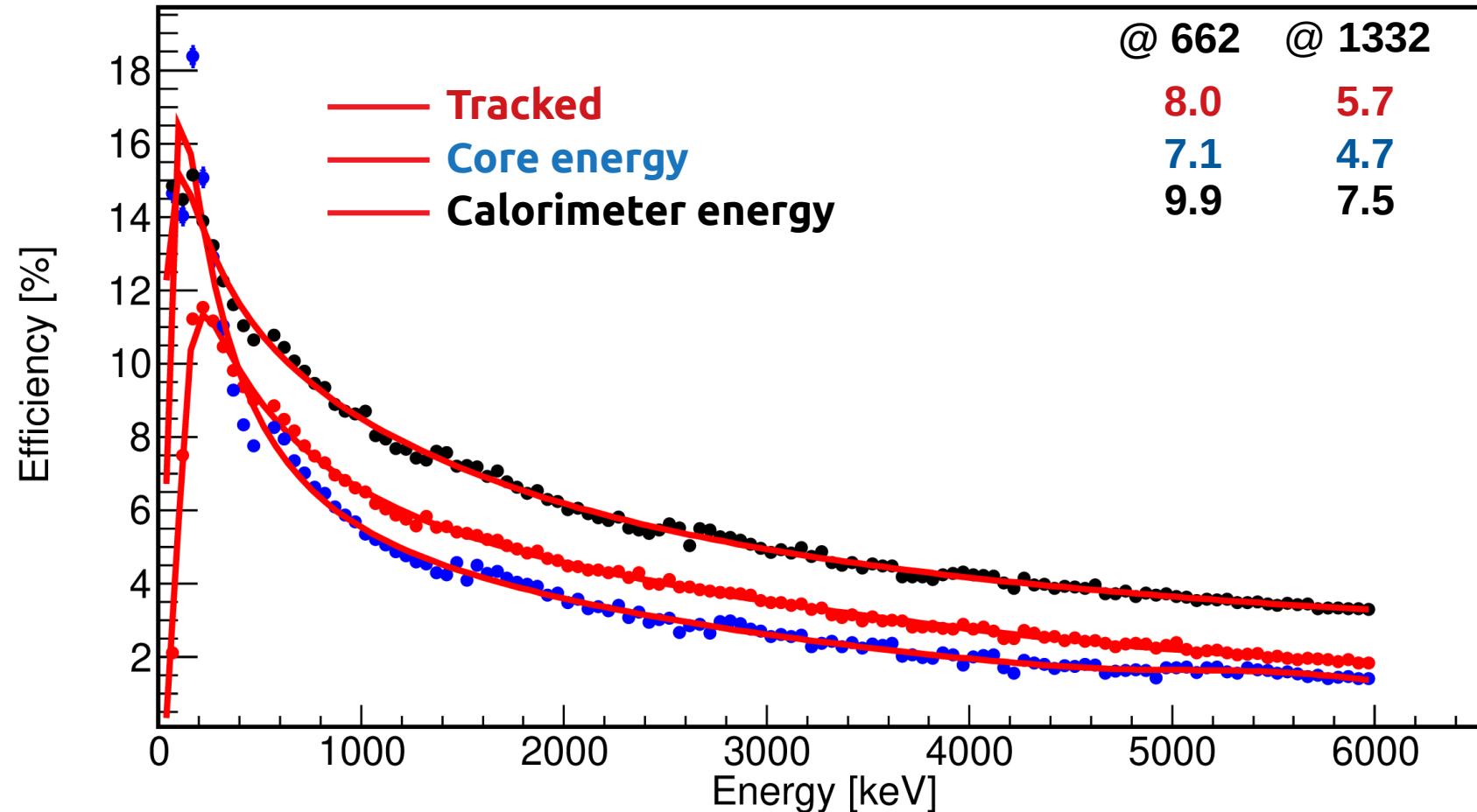


Pb 25 mm

Efficiency curves



UNIVERSITÀ
DEGLI STUDI
DI MILANO



Commissioning Performance and Simulations Session

15th of March 2021

Thank you for listening

