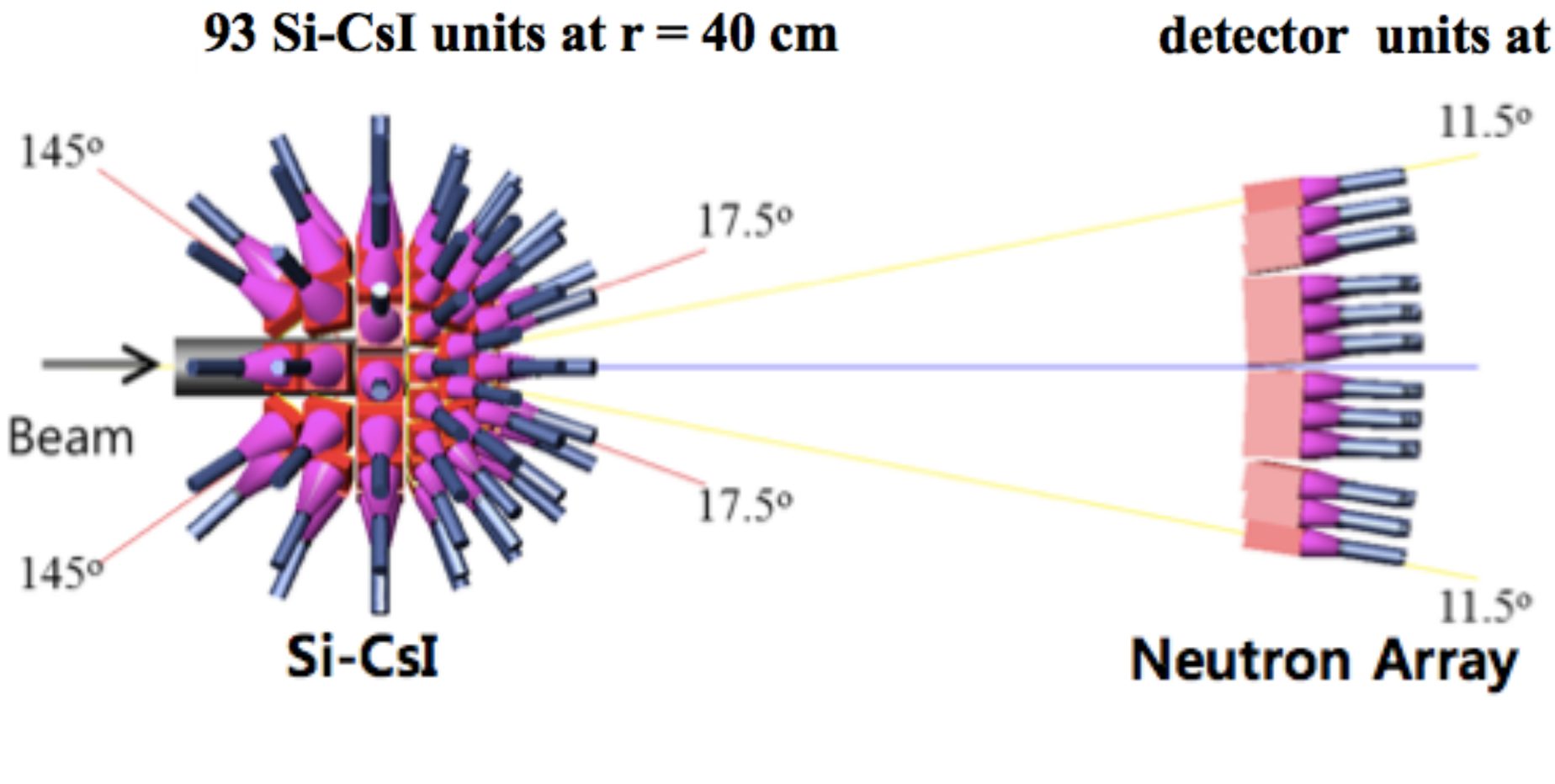
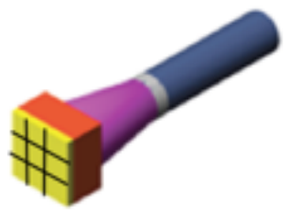
Large Acceptance Multi-Purpose Spectrometer (LAMPS) - low energy

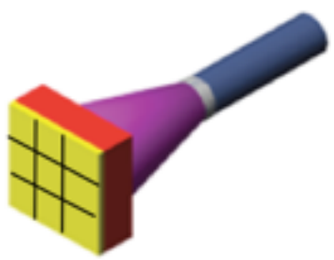


SiCsI Geometry

Total 58 detector units
($17.5^{o} < \theta_{lab} < 77.5^{o}$)
9 x 9 x 0.01 cm^3 Si (3 x 3 Pad)
9 x 9 x 5 cm^3 CsI (PMT readout)



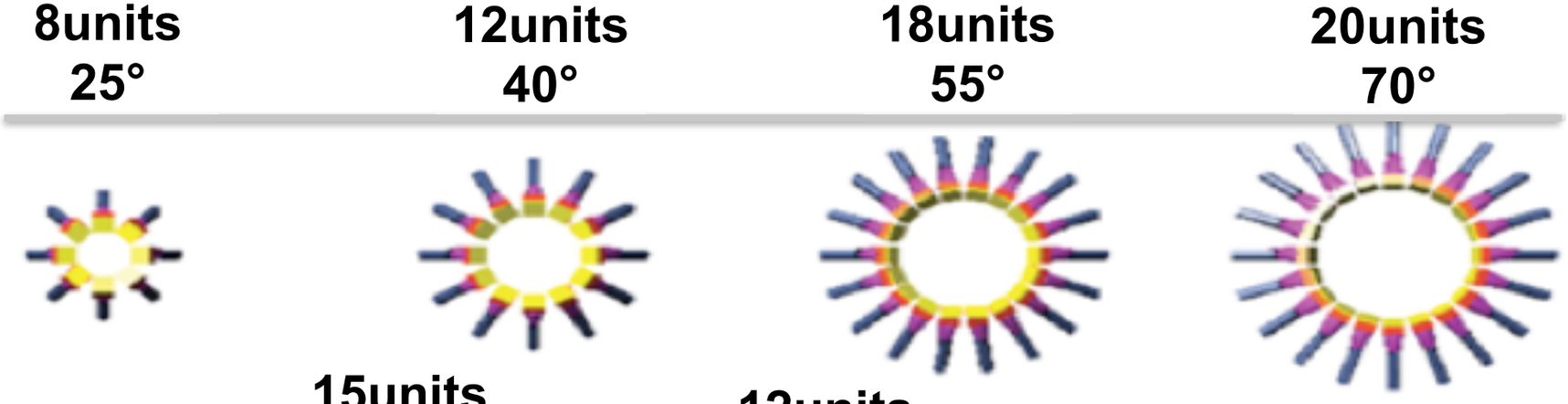
Total 35 detector units
($78^{o} < \theta_{lab} < 150^{o}$)
15 x 15 x 0.01 cm^3 Si (3 x 3 Pad)
15 x 15 x 5 cm^3 CsI (PMT readout)



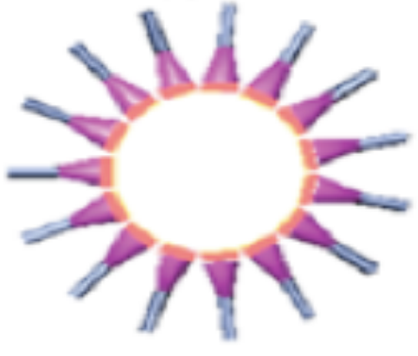
CsI(T1) cover polar angle 17.5° ~ 150°
17.5° ~ 77.5° : 4 detector pieces
(15° interval)

78° ~ 150° : 3 detector pieces
(24° interval)

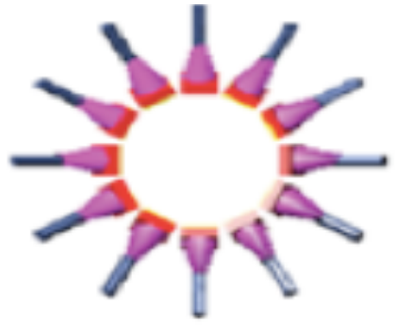
8units **12units** **18units** **20units**
25° **40°** **55°** **70°**



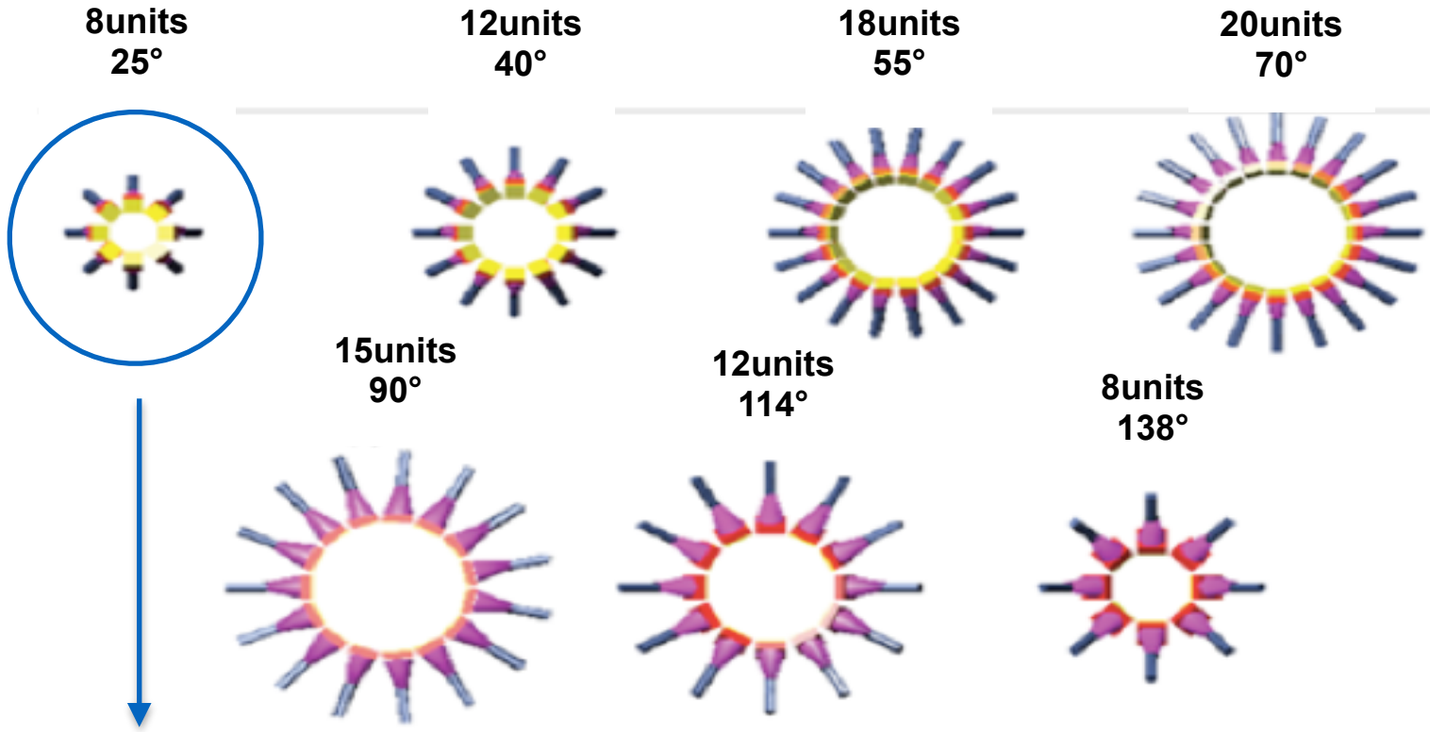
15units
90°

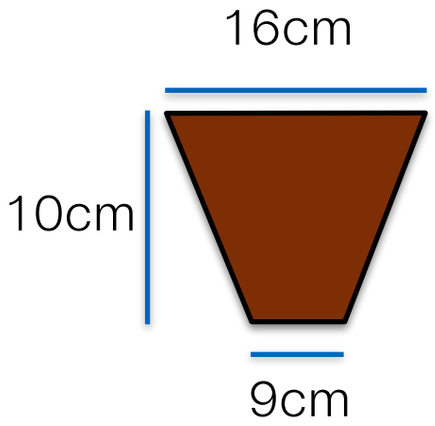


12units
114°

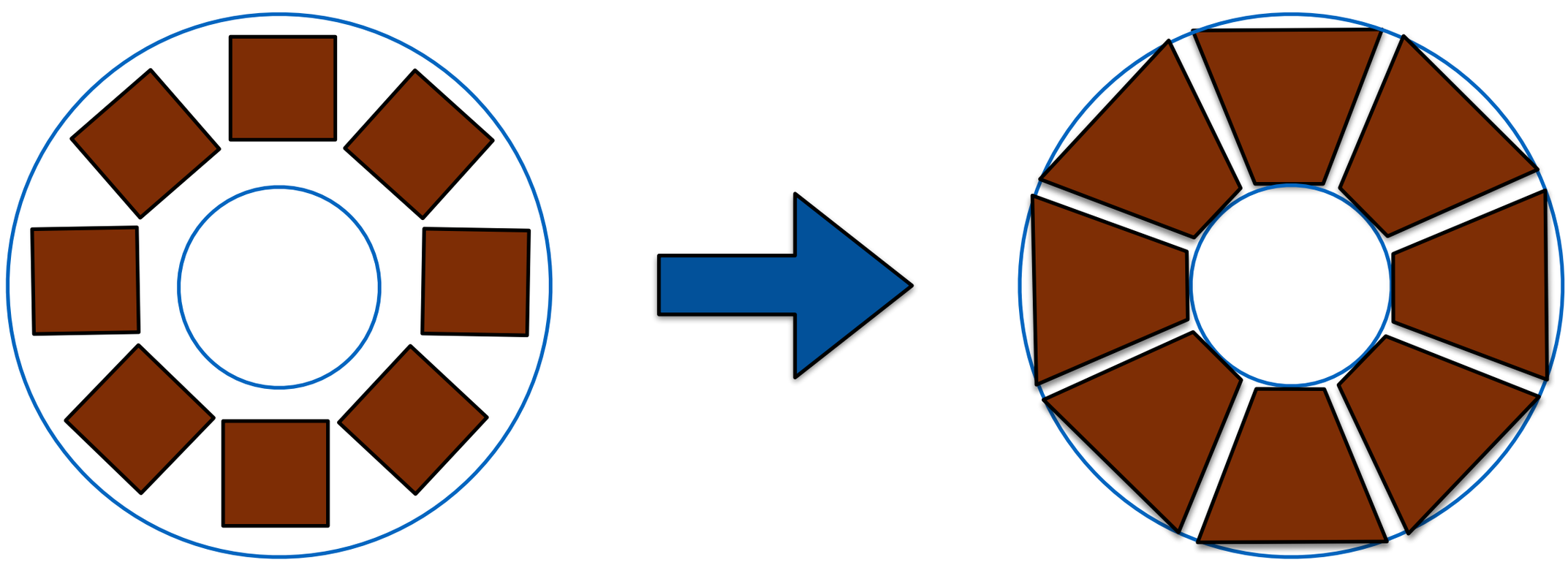


8units
138°

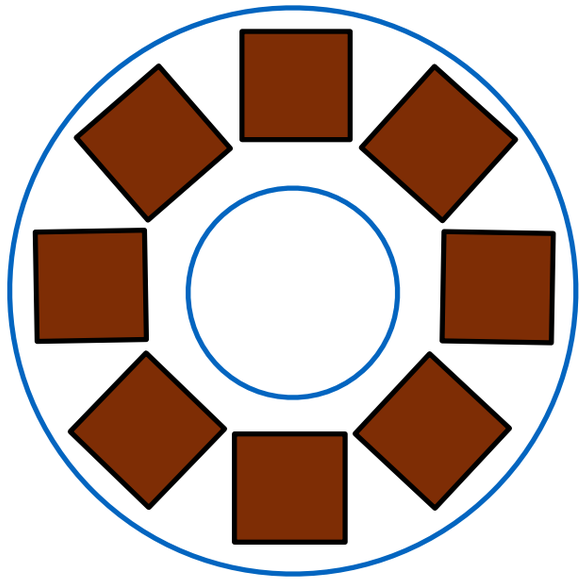


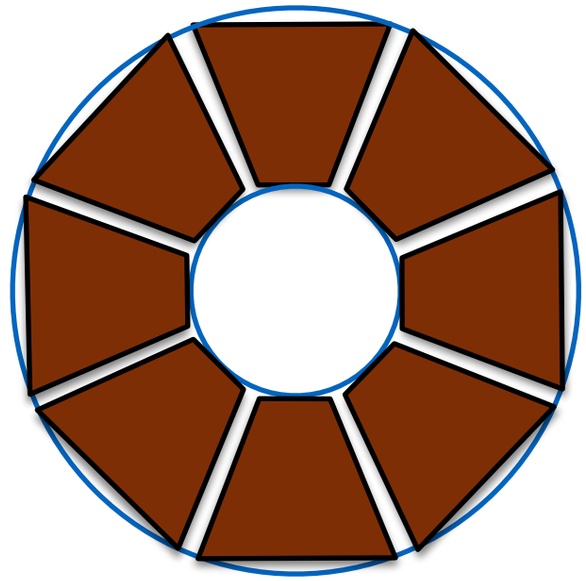


<View from target>



Acceptance – 1st ring





S_g : Area of Sphere
S_D : Area of Detector
A_G : Geometrical Acceptance

S_g : 1109.1 cm^2

S_D : 729.0 cm^2

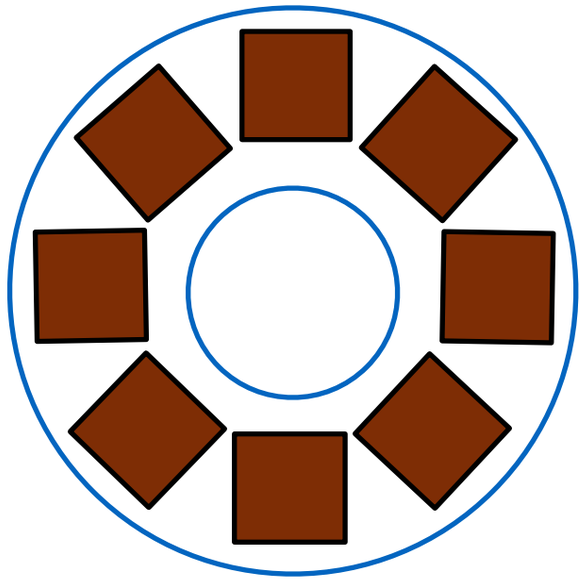
A_G : 65.7 %

S_g : 1109.1 cm^2

S_D : 1000.0 cm^2

A_G : 90.2 %

Acceptance



S_g : Area of Sphere
S_D : Area of Detector
A_G : Geometrical Acceptance

S_g : 1109.1 cm^2

S_D : 729.0 cm^2

A_G : 65.7 %

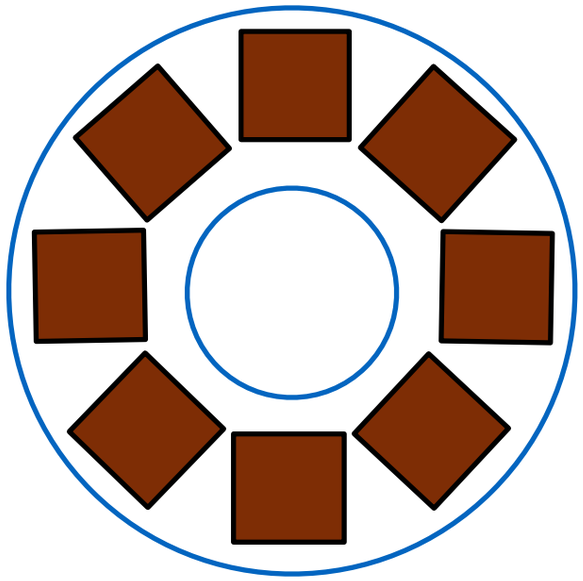
Can't build trapezoid form for Silicon

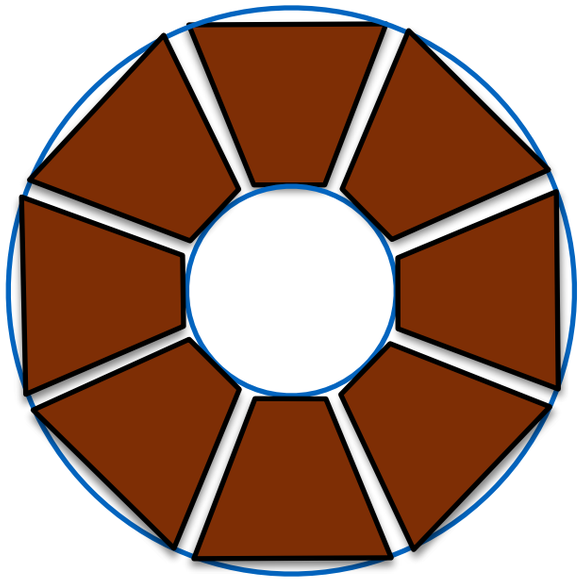
S_g : 1109.1 cm^2

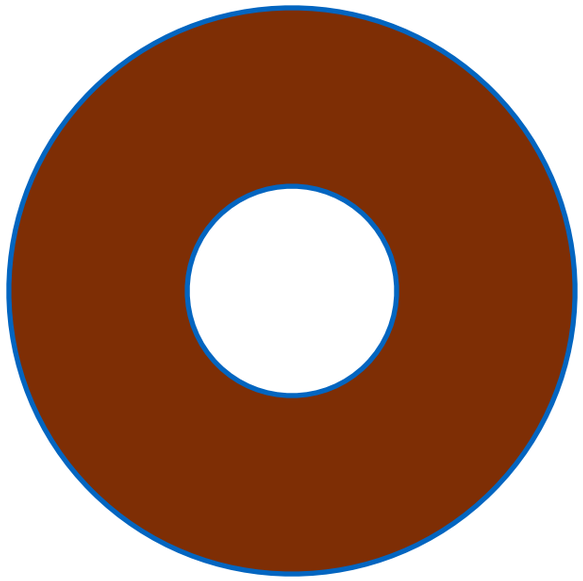
S_D : 1000.0 cm^2

A_G : 90.2 %

Acceptance – 1st ring







N(gen) : Number of particles for each event from generated AMD data

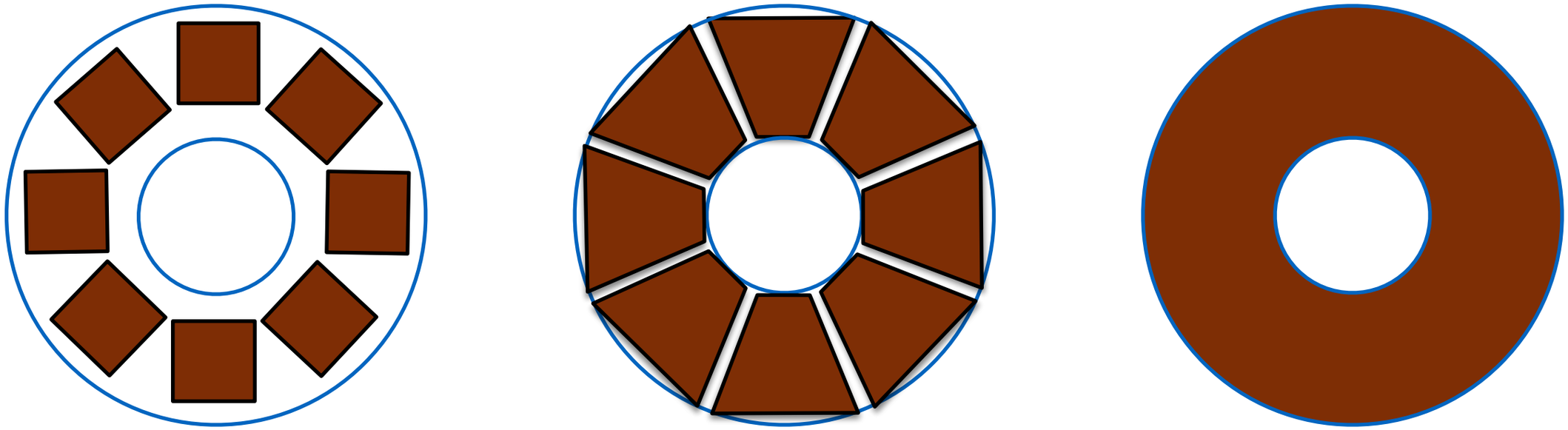
N(det) : Number of particles for each event detected from the detectors

Acc(simul) : Acceptance (Detected particle)

Acc(geom) : Acceptance (Simulation)

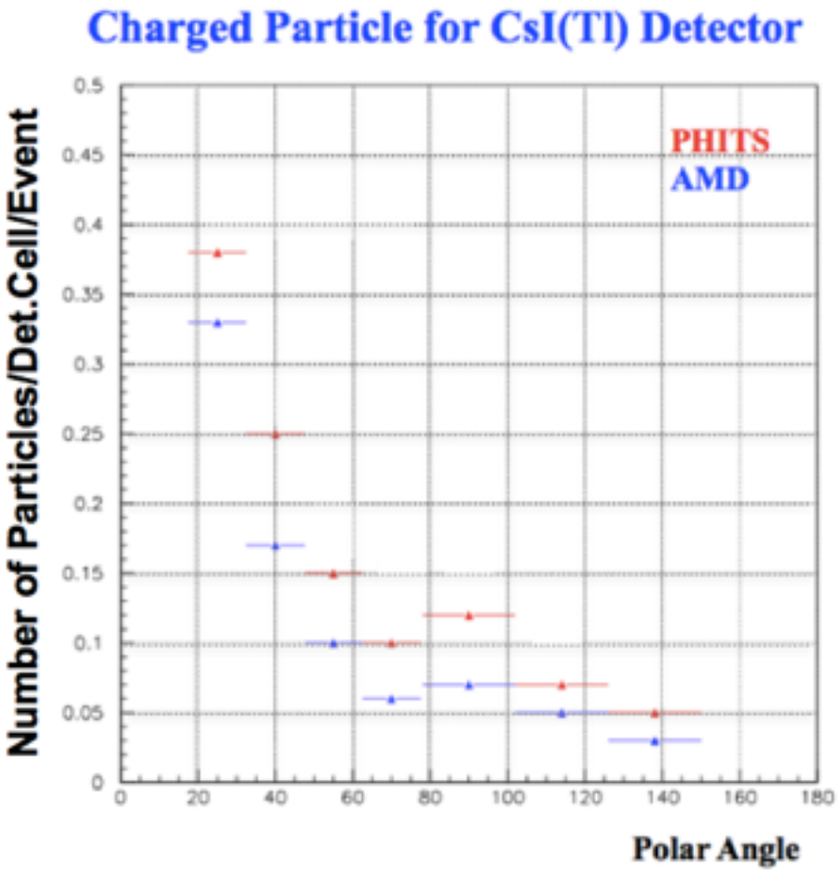
	Square	Trapezoid	Sphere
N(gen)	2.67	2.67	2.67
N(det)	0.90	1.34	1.59
Acc(simul)	33.7%	50.2%	59.6%
Acc(geom)	65.7%	90.2%	100%

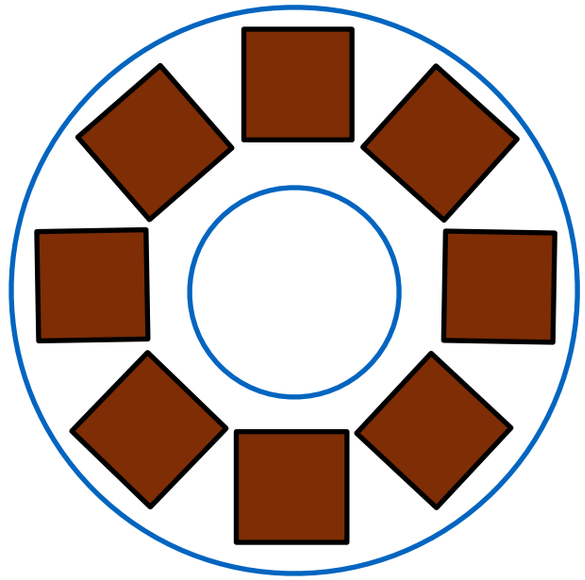
1st ring – change to vacuum



	Square	Trapezoid	Sphere
N(gen)	2.67	2.67	2.67
N(det)	1.53	2.25	2.67
Acc(simul)	57.1%	84.1%	100%
Acc(geom)	65.7%	90.2%	100%

Acceptance – 1st ring

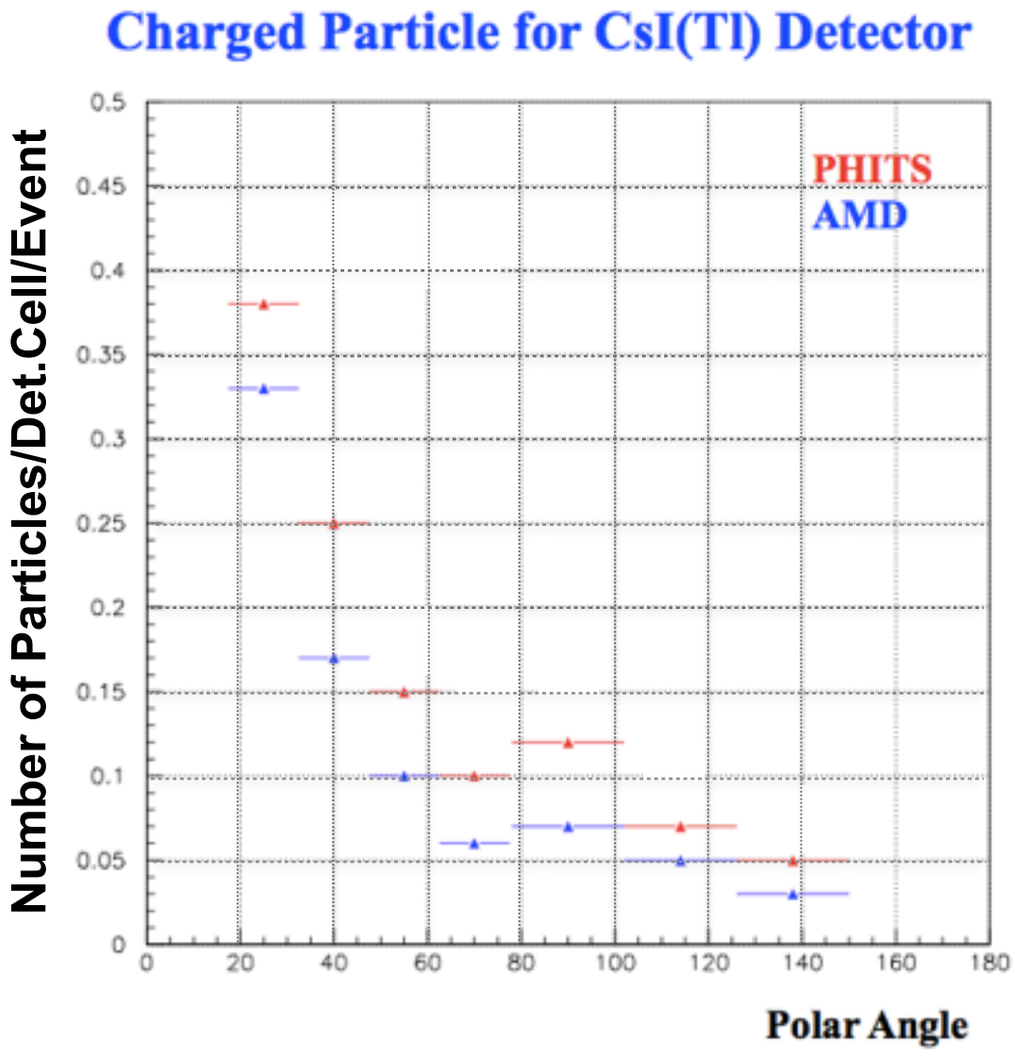


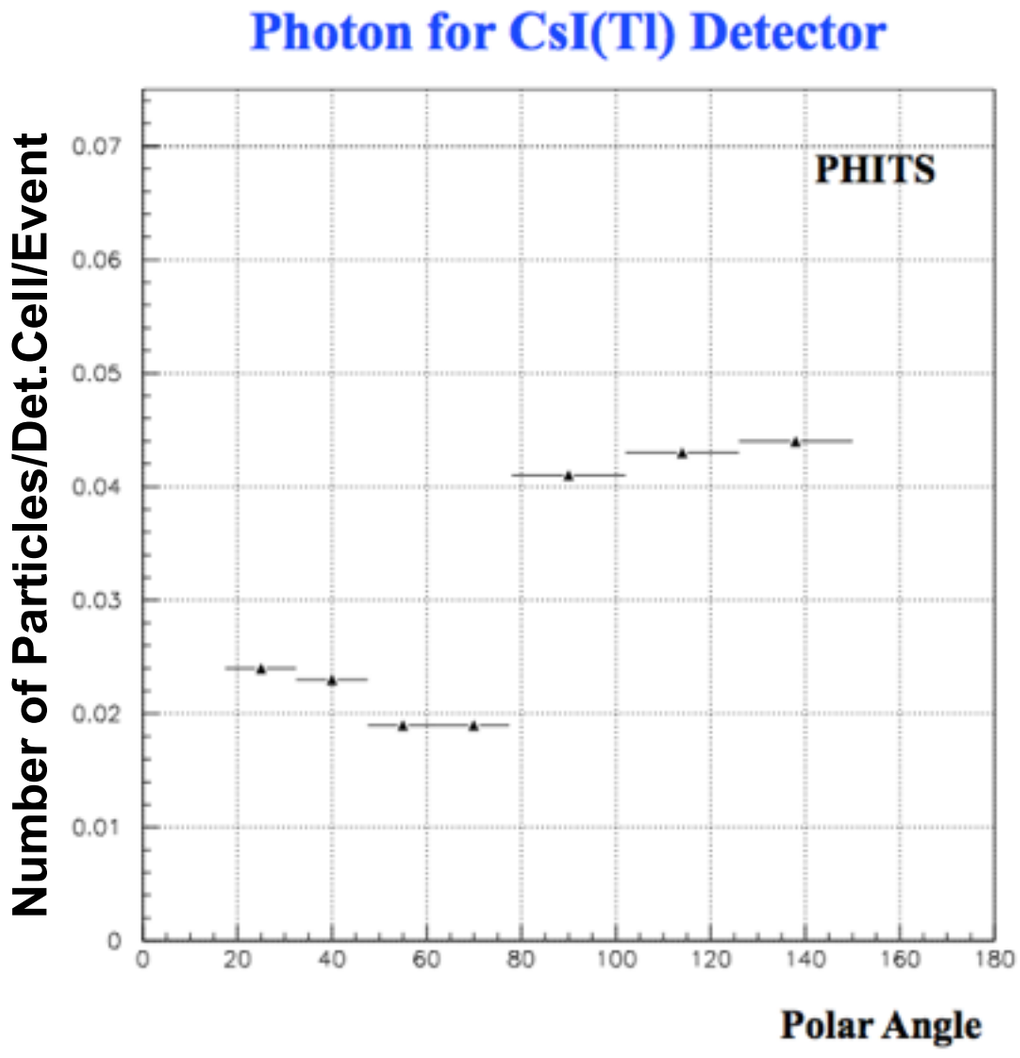


	Acc(simulation)	Occ (geometrical)	Occ (detected)
Square (9x9 cm^2)	57.1%	0.33	0.19

Back- up

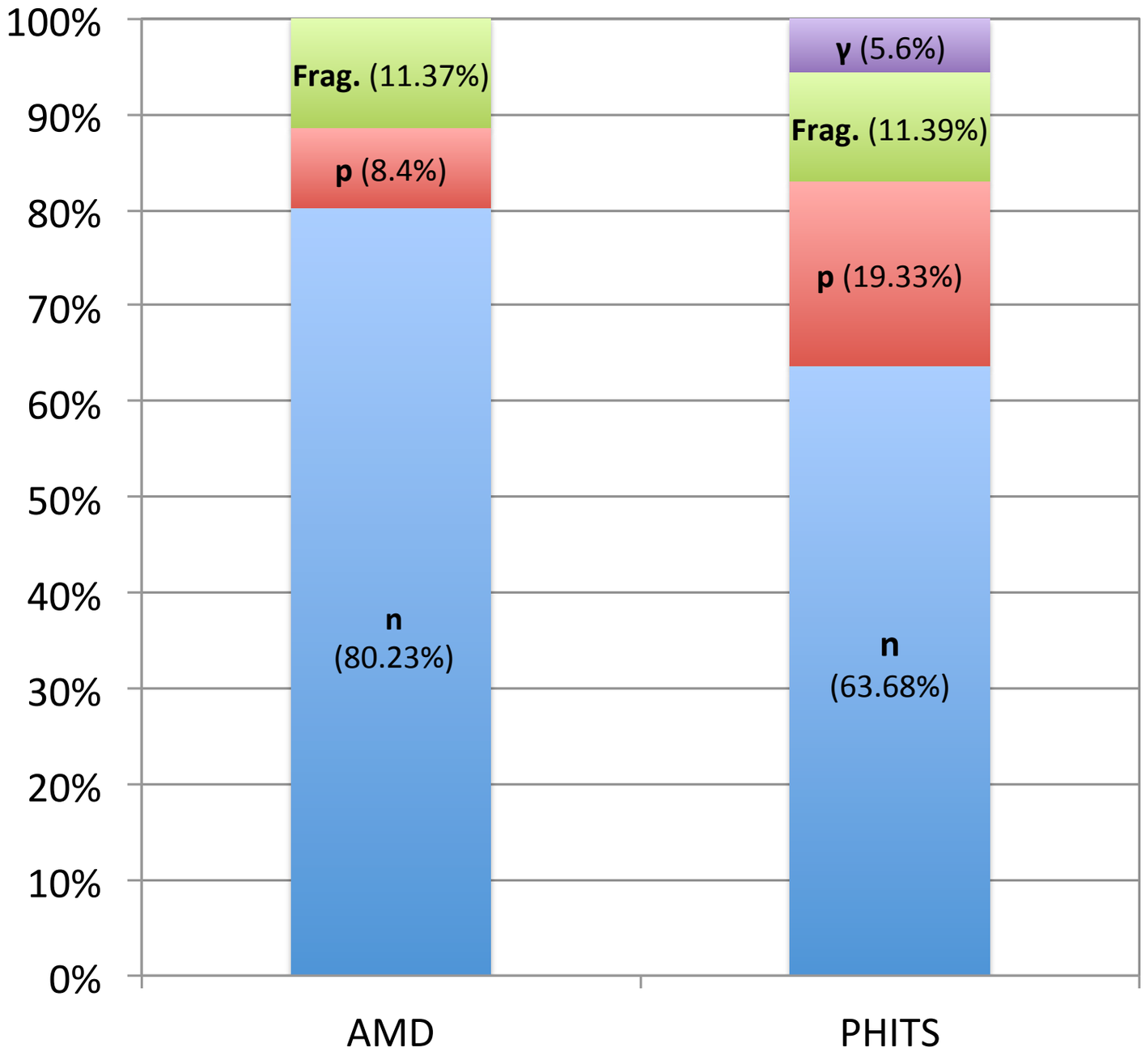
Design of Si/CsI for LAMPS-L





CsI(T1) cover polar angle 17.5° ~ 150°
17.5° ~ 77.5° : 4 detector pieces 15° interval
78° ~ 150° : 3 detector pieces 24° interval

AMD & PHITS



AMD : $^{132}Sn + ^{124}Sn$ - (20 MeV/u)
impact parameter : b = 0
N_{event}=2010

PHITS : $^{132}Sn + ^{124}Sn$ - (18.5 MeV/u)
impact parameter : wide
N_{event}=272018

AMD&PHITS – Kinetic Energy (Charged/Neutron)