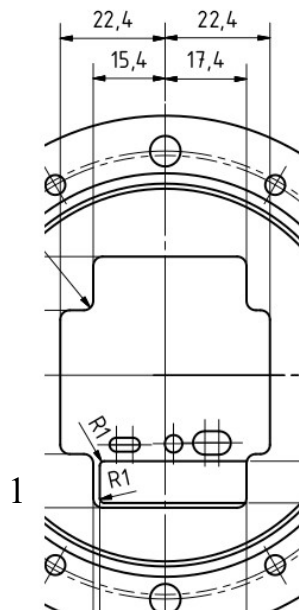
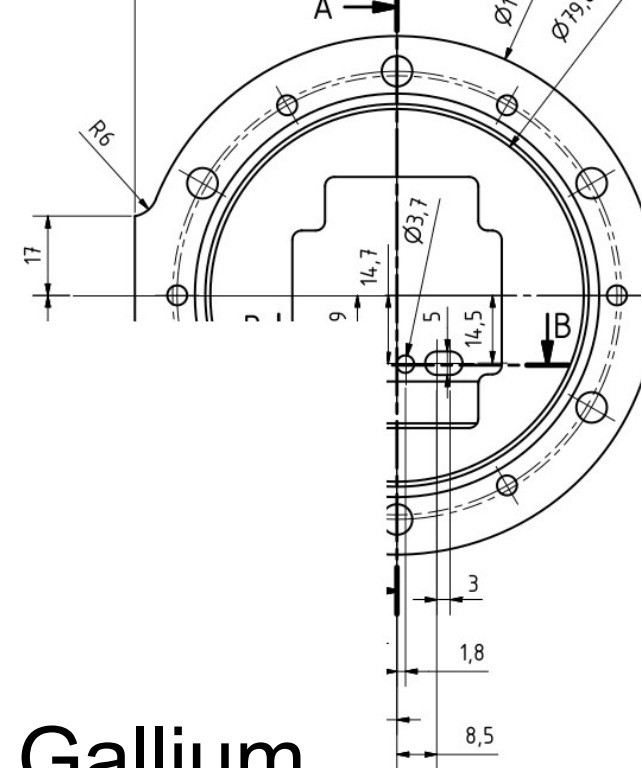
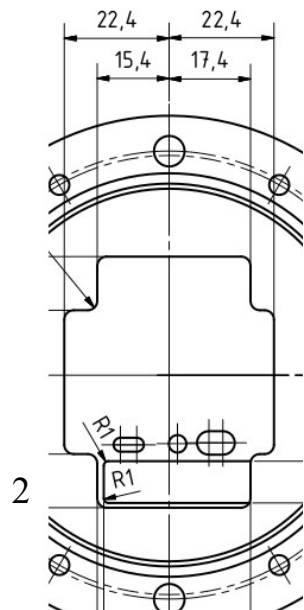
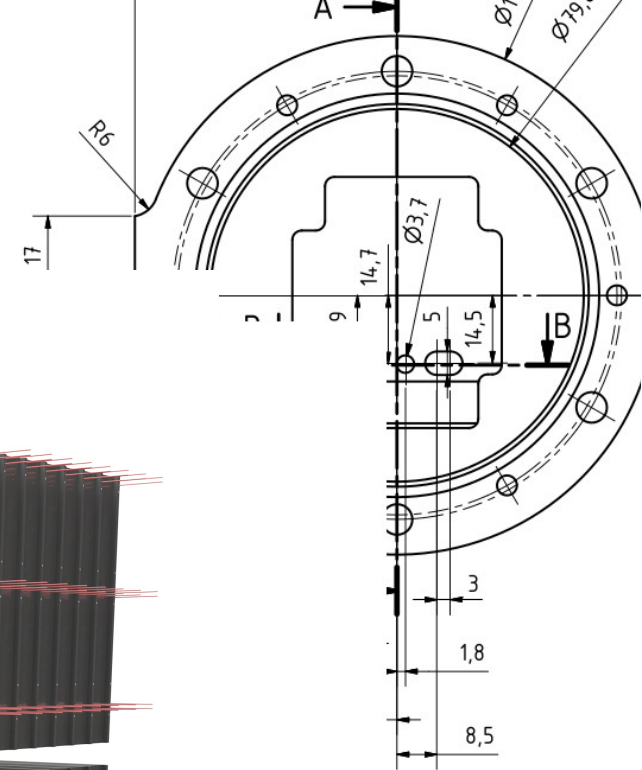
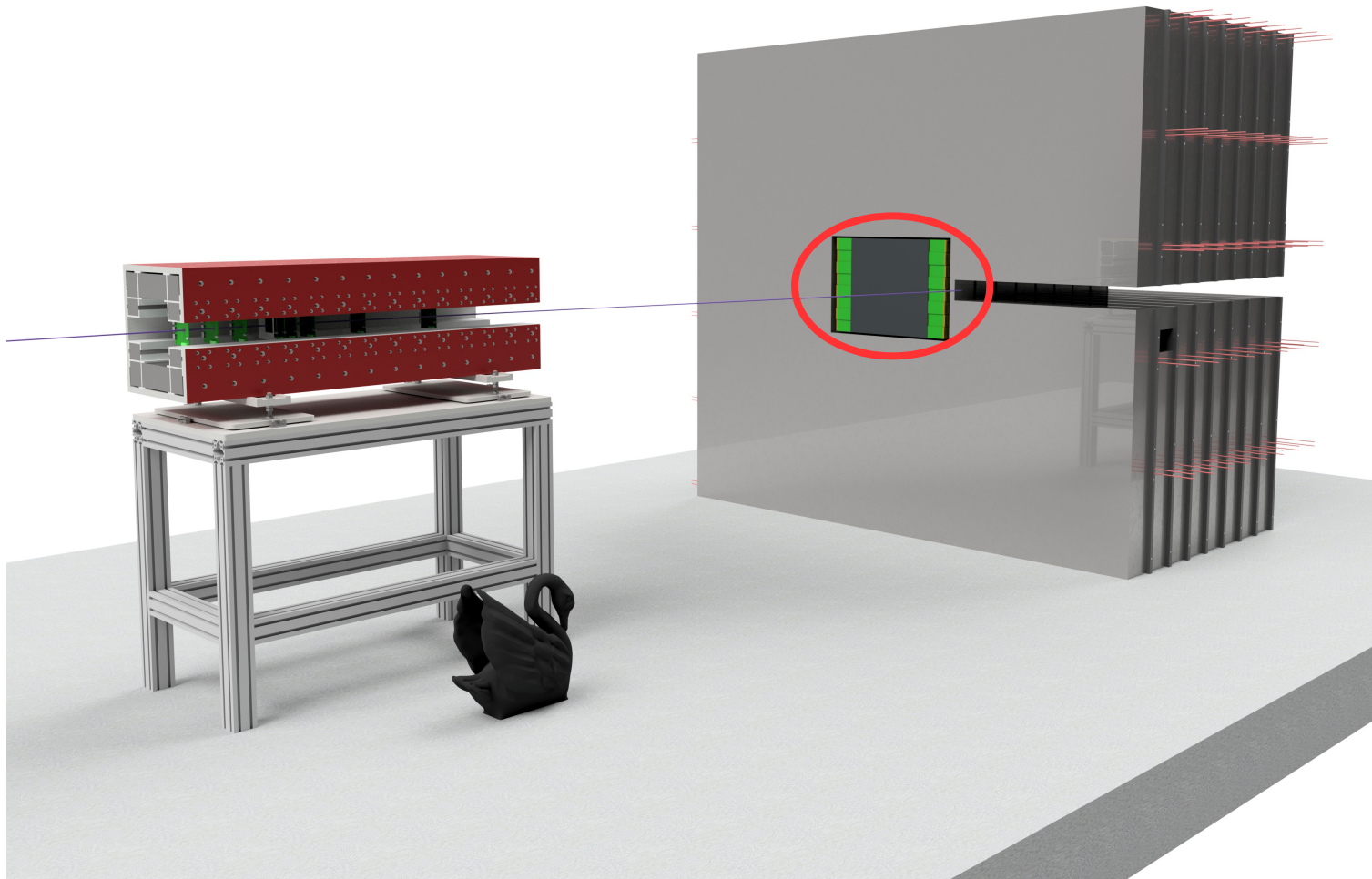


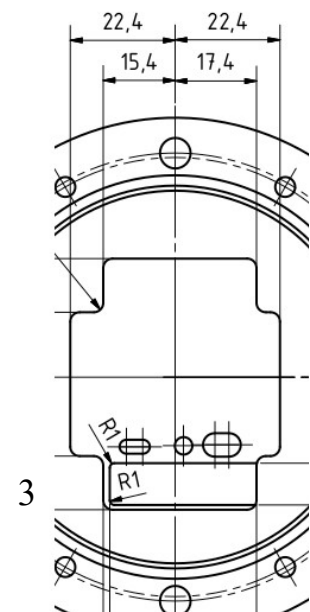
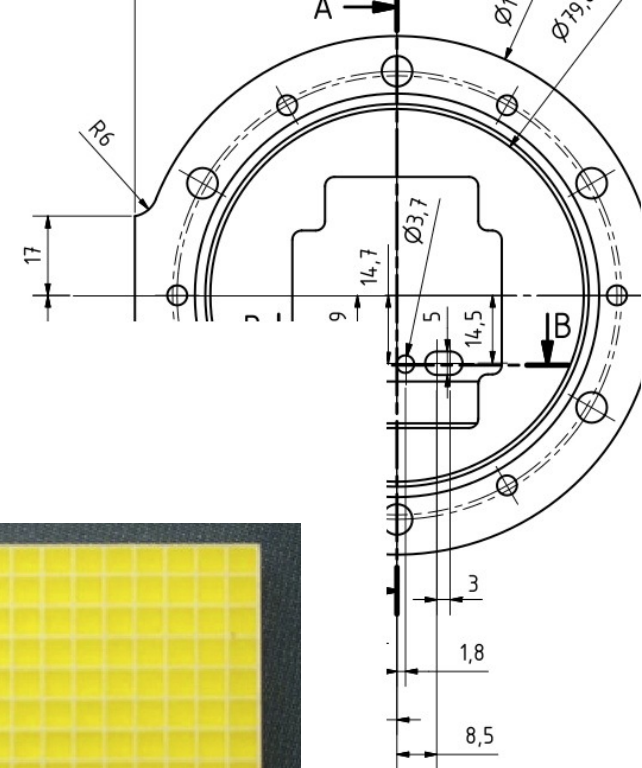
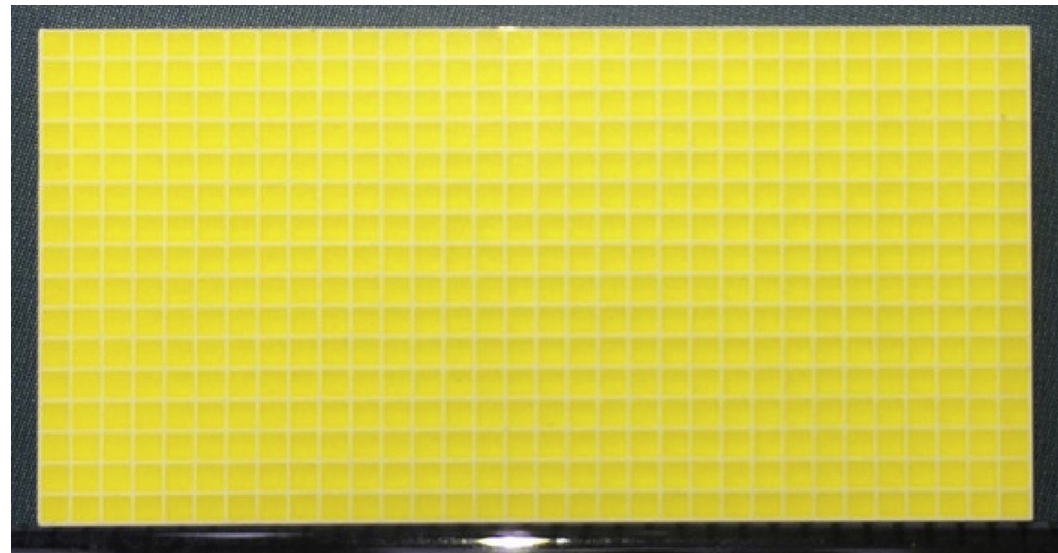
Cerium-doped Gadolinium Yttrium Gallium Aluminum Garnet GYGAG(Ce)



ECal

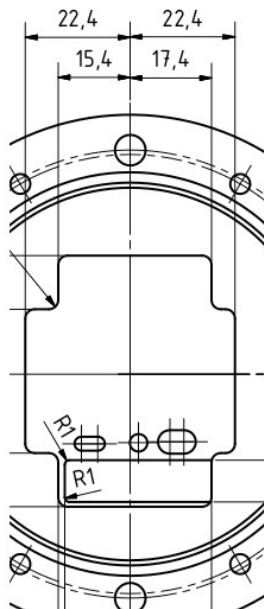
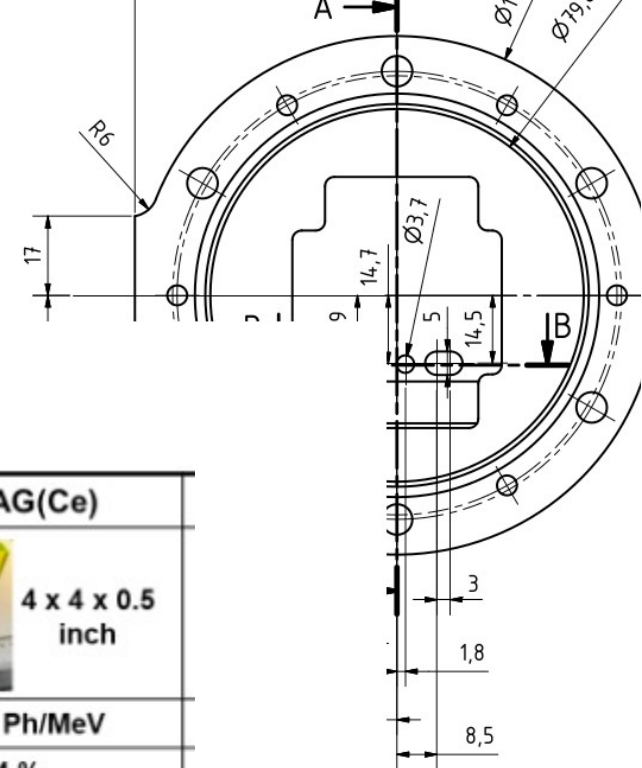


What is GYGAG(Ce)



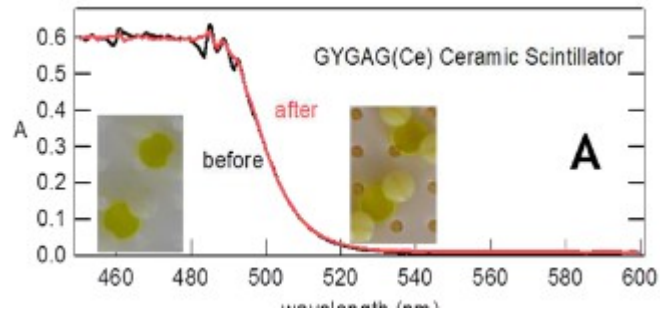
Properties

Property	Nal(Tl)	GYGAG(Ce)
	 2 x 2 x 2 inch	 4 x 4 x 0.5 inch
Light Yield	38,000 Ph/MeV	50,000 Ph/MeV
Non-proportionality contribution to R(662 keV)	5.0 %	2.4 %
Emission peak	415 nm	540 nm
Principal decay (ns)	230	100
Density (g/cm ³)	3.7	5.8
Z _{eff}	50	48
Physical	Fragile, hygroscopic, yellows over time	Strong, fracture-tough, insoluble
Intrinsic Radioactivity	None	None
Photopeak Efficiency (1.5" x 2", 662 keV)	20 %	38 %
R(662 keV), at size 8 in ³	7.5 %	7.5 %



Rad. hardness

53 MRad Bremsstrahlung (9 MeV)



3.1 G Gy e⁻ (0.75 MeV)

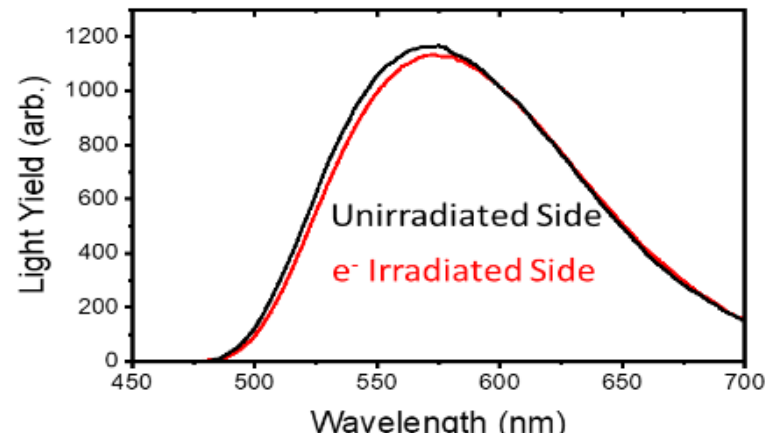
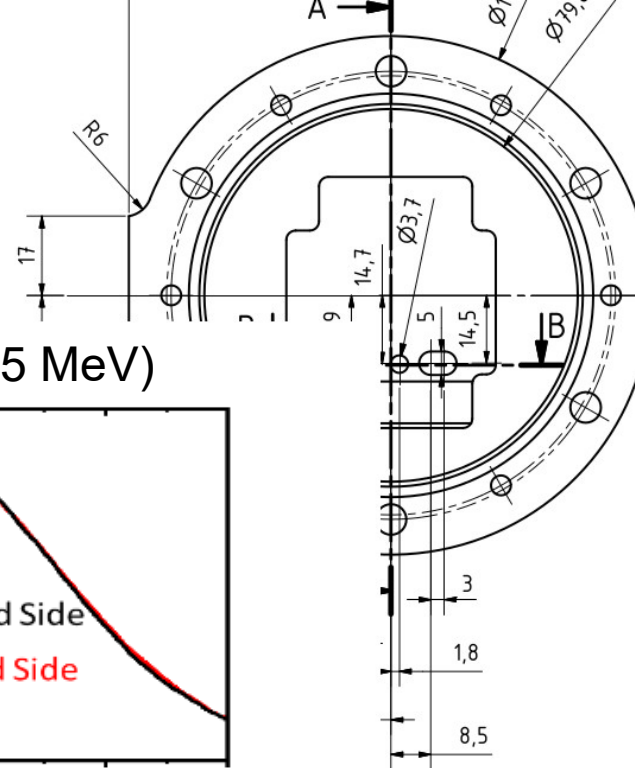


Table 1. Beta-Excited Light Yield As A Function Of Irradiation Energy And Fluence¹⁴

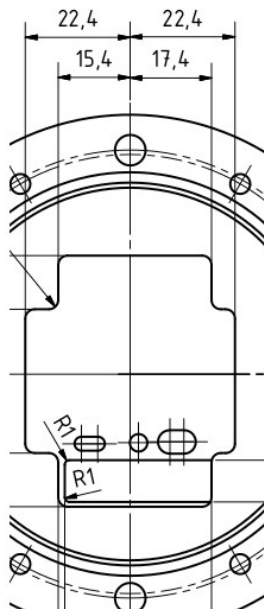
Energy (MeV)	e ⁻ Range (cm)	Fluence (e ⁻ /cm ²)	Δ Light Yield (%)
0.5	0.06	10 ¹⁷	-8.0±8
0.75	0.1	10 ¹⁷	-5.0±7
0.75	0.1	10 ¹⁹	-3.5±7
1.0	0.14	10 ¹⁶	0±5
1.0	0.14	10 ¹⁷	-6.9±6
2.0	0.30	10 ¹⁷	-0.4±5

Table 2 Alpha-Excited Light Yield As A Function Of Irradiation Energy And Fluence¹⁴

Energy (MeV)	e ⁻ Range (cm)	Fluence (e ⁻ /cm ²)	Δ Light Yield (%)
0.5	0.06	10 ¹⁷	-15.0±12
0.75	0.1	10 ¹⁷	-11±11
1.0	0.14	10 ¹⁷	-9.0±10
2.0	0.30	10 ¹⁷	-9.0±10

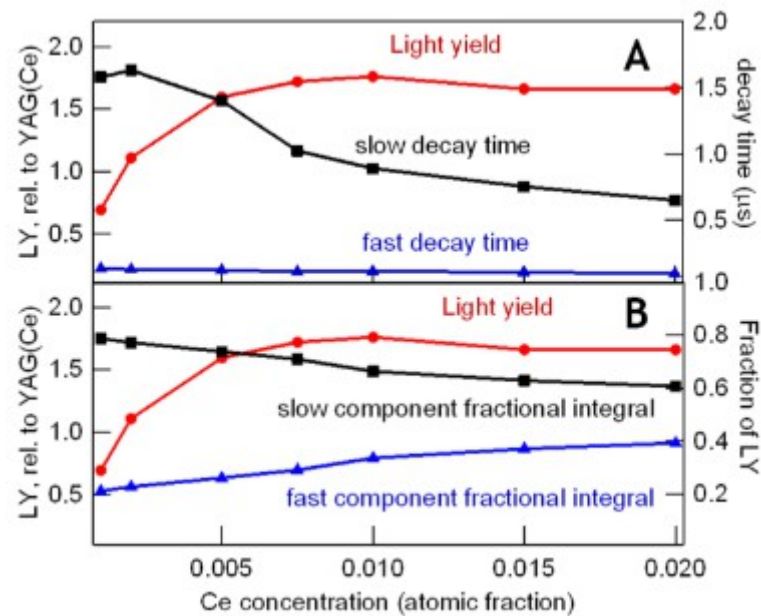


B-B

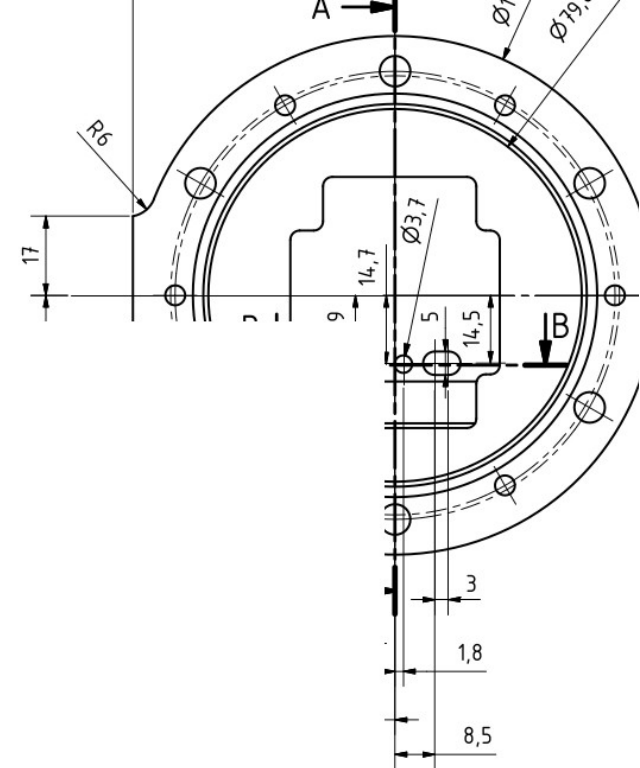


5

Timing



- Fast decay ~100 ns
- Similar materials might reach ~25ns



B-B

