CPS Document

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March 27, 2018

Outline

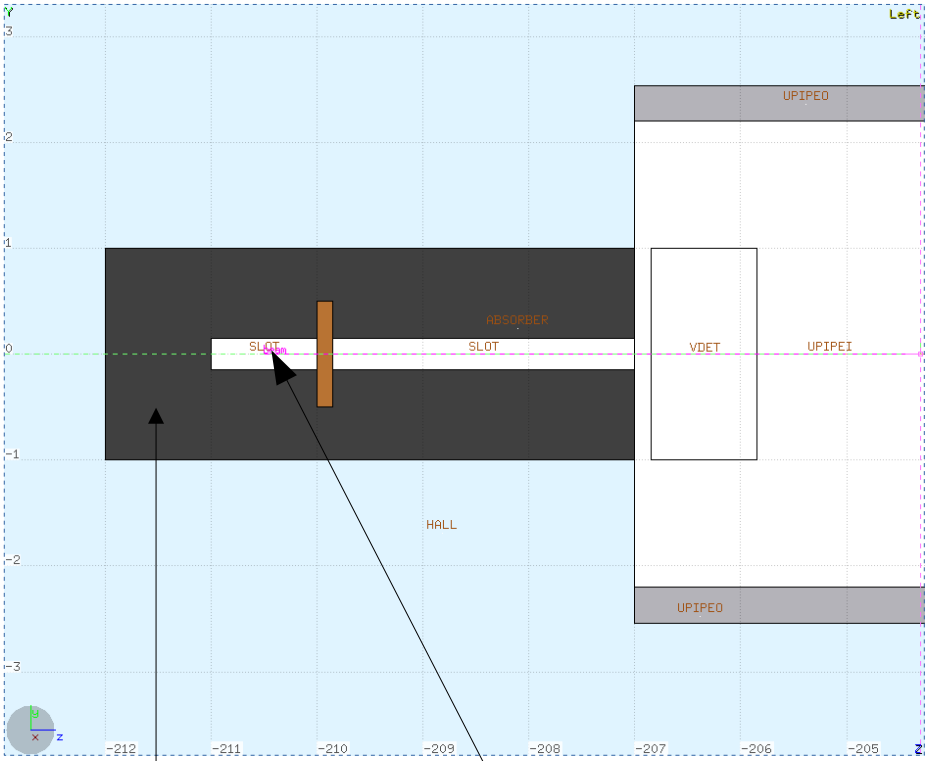
1) On going projects

2) Figures will be provided

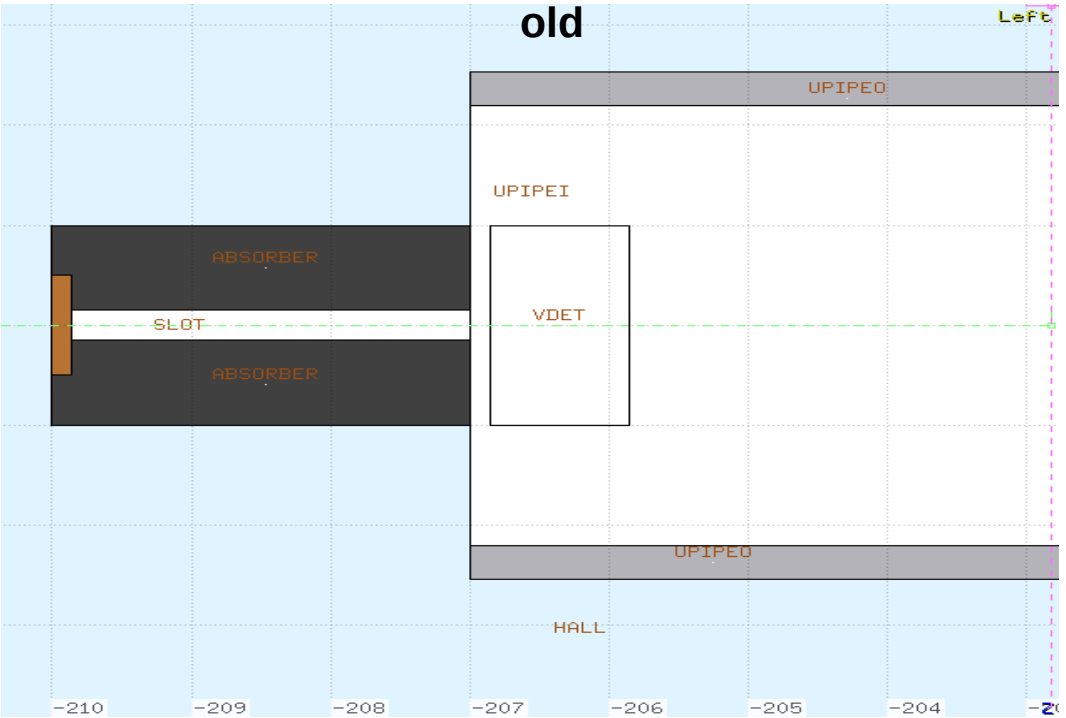
3) Comments to version 1

On-going Project

new



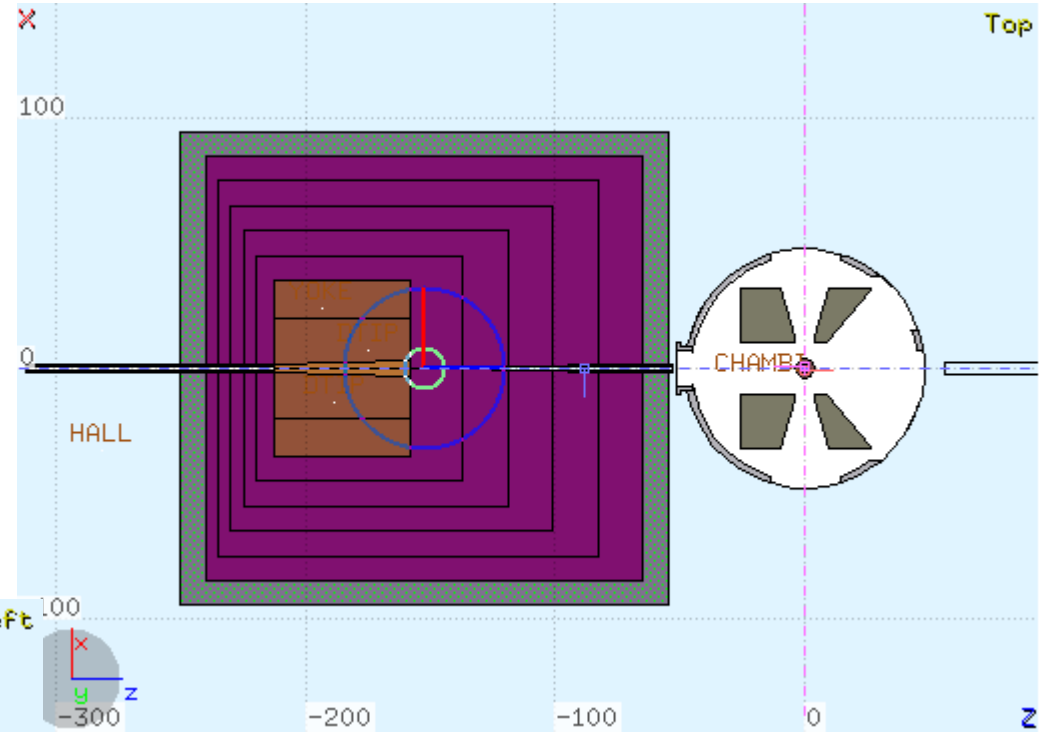
old

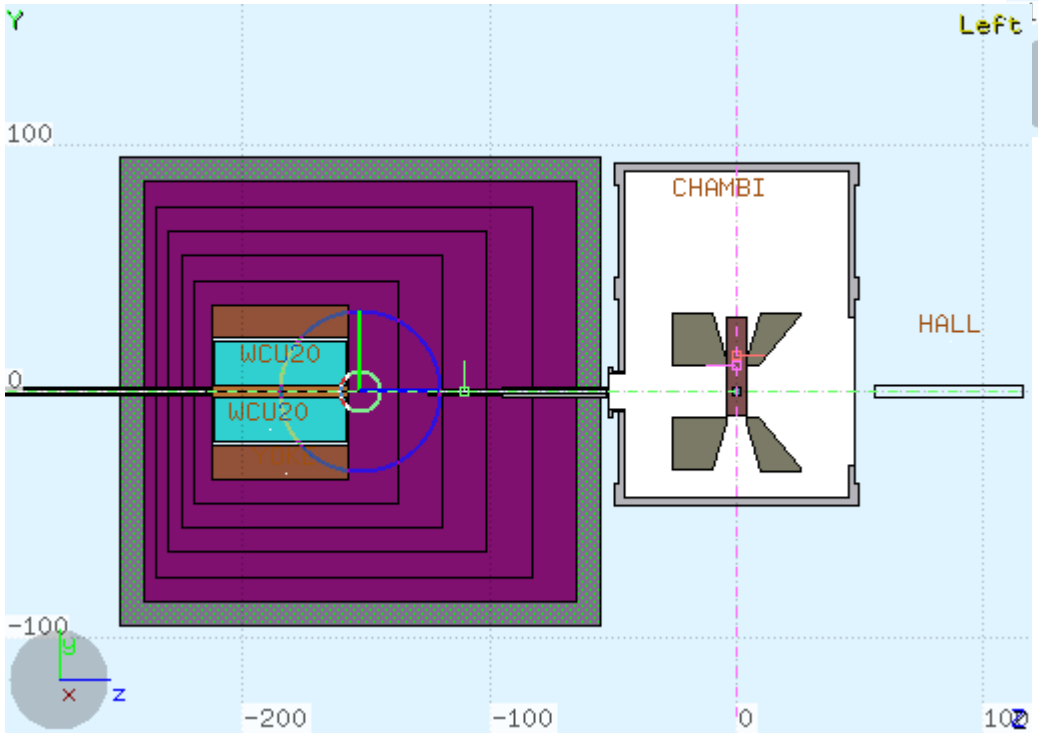


1) place black hole material behind the stopper.
2) beam electron starts from here.

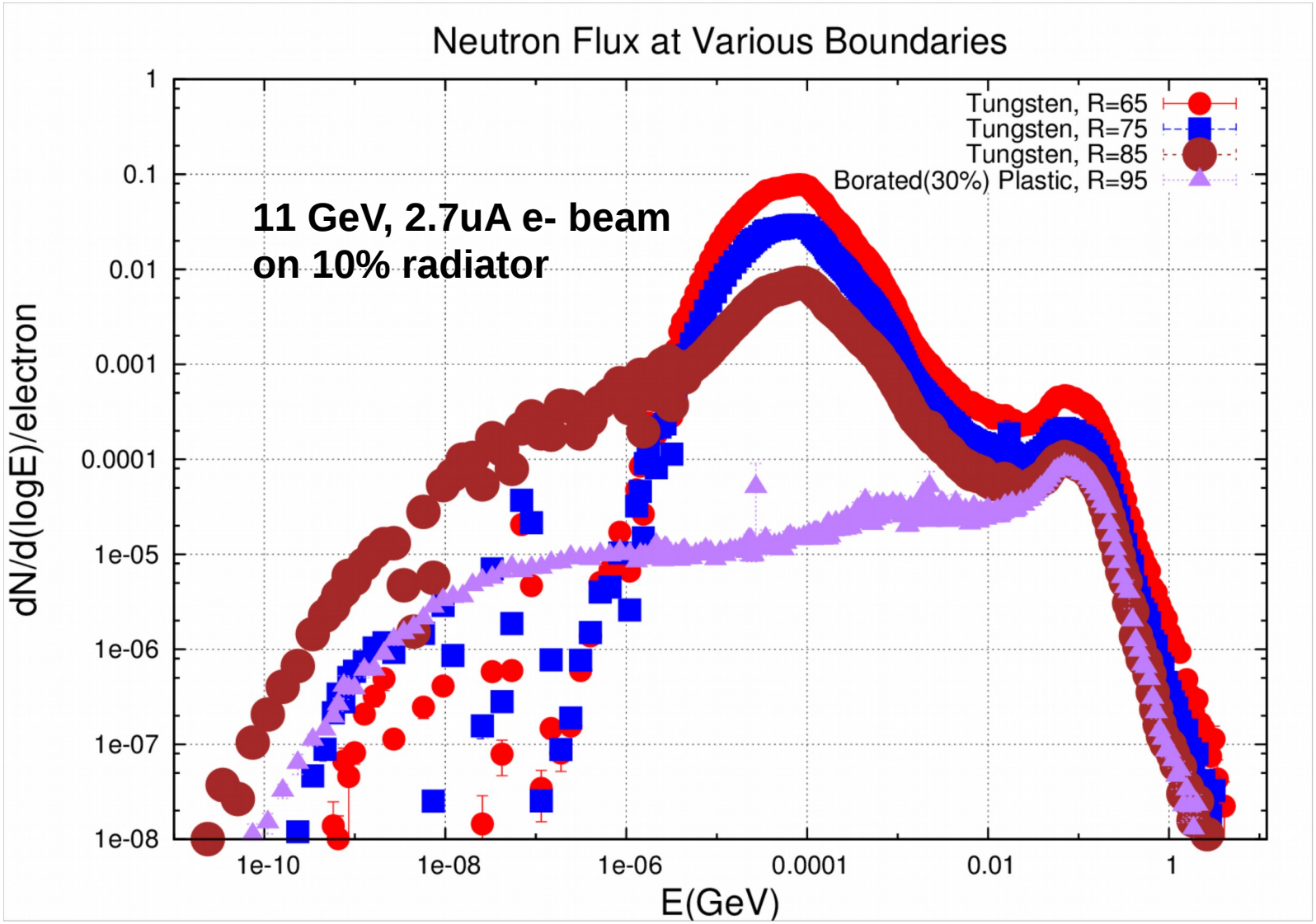
Keep other parameters unchanged. Will run enough events to produce figures.

Geometry Figures (png)





Neutron Fluence Figure (eps)

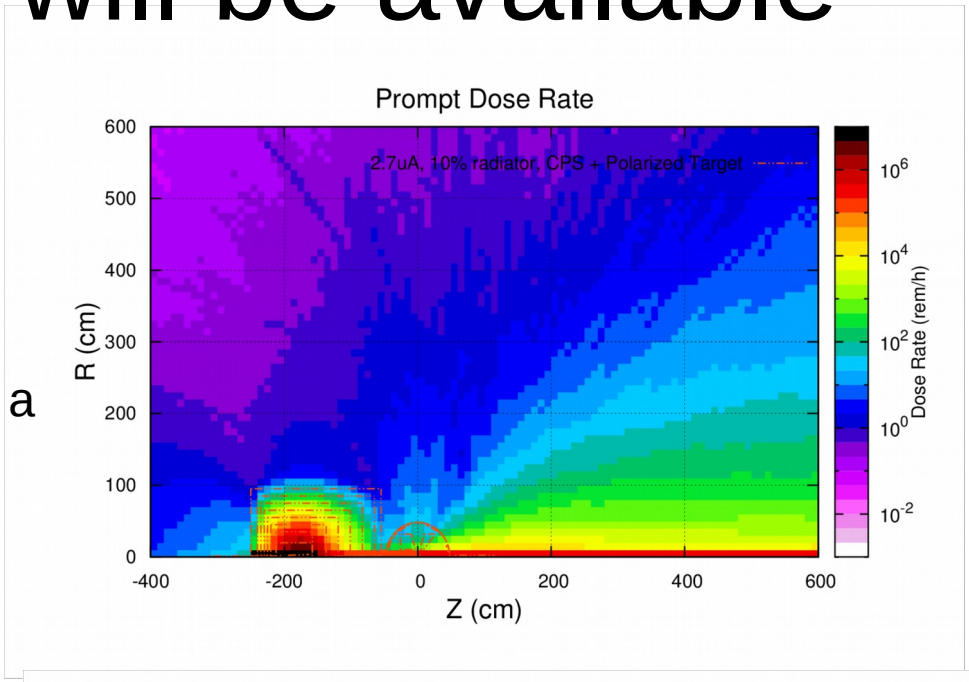


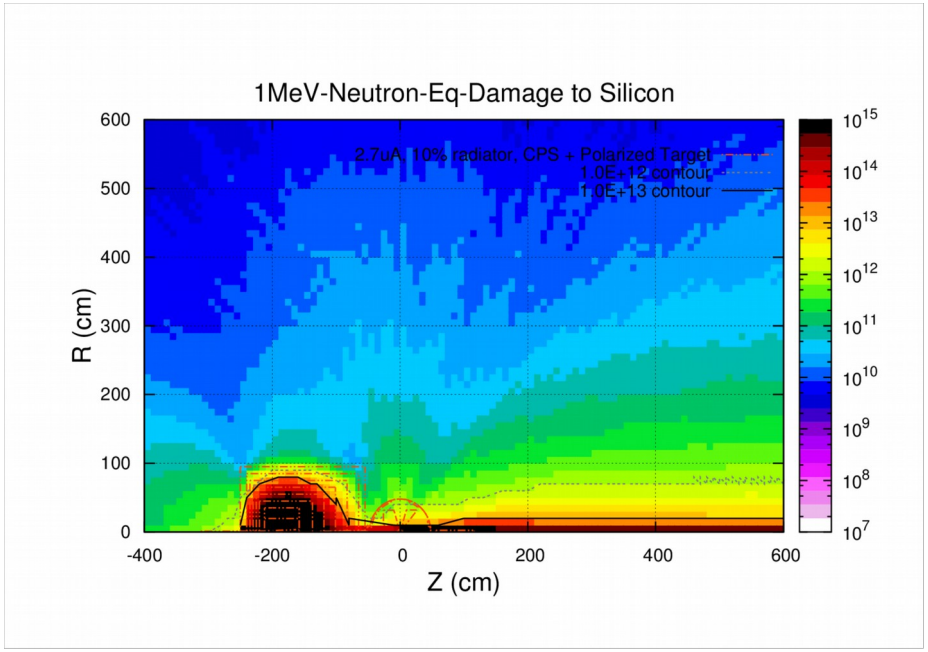
10cm thick 30% borated plastic layer reduces neutron flux a lot. Very helpful.

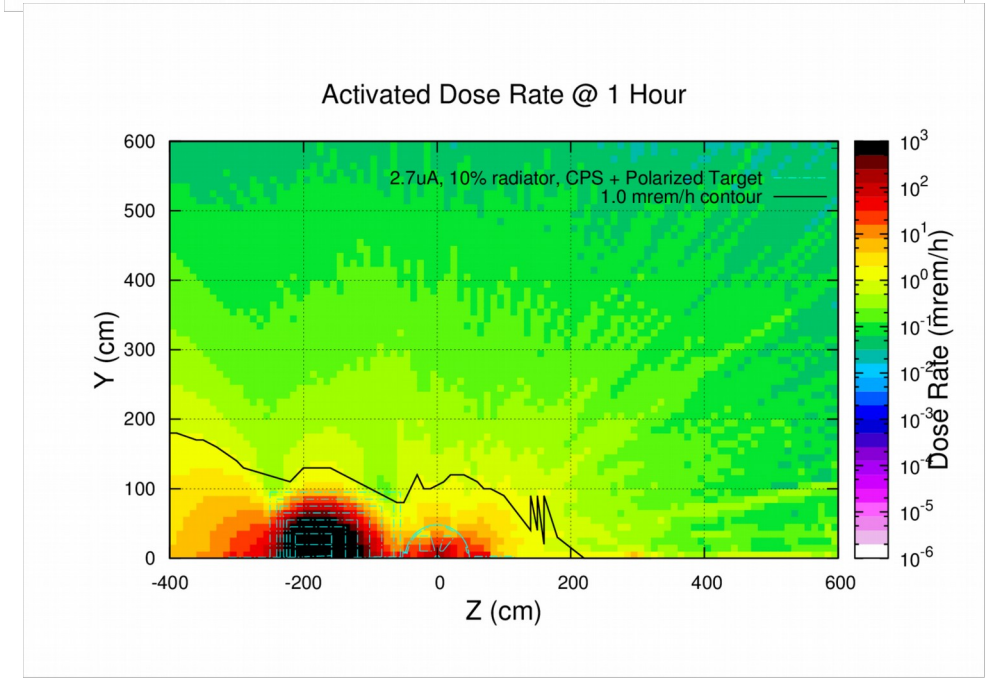
Other Figures will be available

1. Prompt dose rate
2. 1MeV-Nu-Eq. Dose
3. Activation dose rate
4. others? (heat load distribution?)

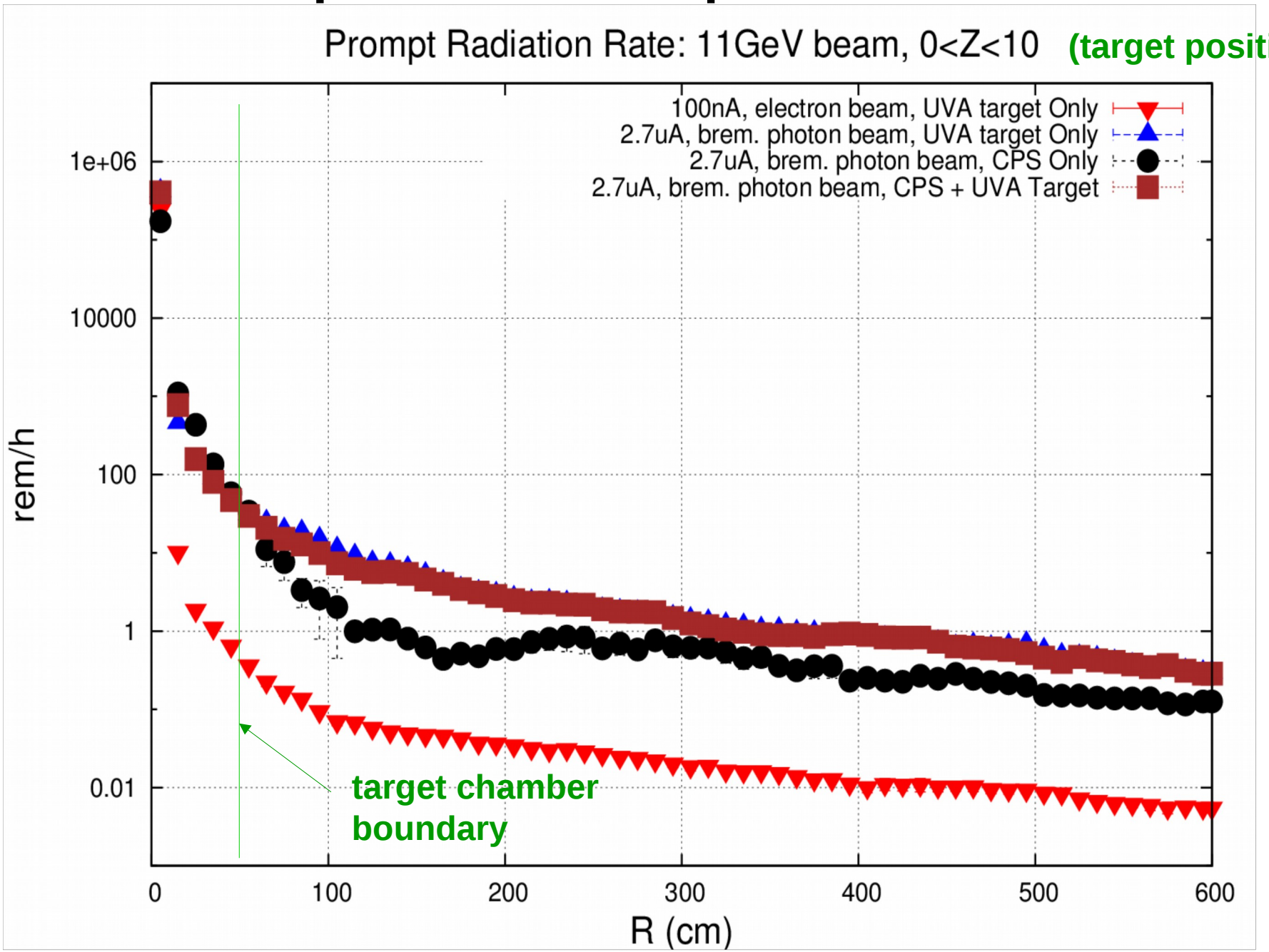
Can place 4 activation dose rate figures into a 2x2 table.







Compare Prompt Dose Rate



Comments to Document v1.0

1) will provide better quality figures

2) Appendix 2: Benchmark comparison

The table need to be updated (see next 2 pages)

Compare Prompt Dose Rates

Prompt Dose Rate (rem/h), tungsten powser density = 15.6 g/cm^3.
Jixie had 5 MeV photon energy cut, George used 7 MeV

material	source	No plastic	No plastic	No plastic	No plastic	With 10cm plastic	With 10cm plastic
		Pavel	Jixie (5 MeV)	Igor	George (7MeV)	Pavel	Jixie
iron	neutron	146	10.0 +/- 0.1%	11.5 +/- 6%	9.5 +/- 0.3%	0.8	0.11 +/- 3.4%
iron	photon	0.44	0.039 +/- 0.6%	0.158 +/- 29%	0.025 +/- 0.9%	2.8	0.063 +/- 0.7%
natual tungsten	neutron	N/A	1.7 +/- 2.5%	N/A	N/A	N/A	0.15 +/- 10%
natual tungsten	photon	N/A	0.0002 +/- 39%	N/A	N/A	N/A	0.0007 +/- 24%
tungsten powder	neutron	13.0	9.37 +/- 0.9%	4.4 +/- 11%	N/A	2.7	0.52 +/- 15.3%
Tungsten powder	photon	0.06	0.0010 +/-10.3%	0.0002	N/A	0.003	0.0052 +/- 8.3%

Prompt Dose Rates with Various Photon Energy Cuts

Prompt Dose Rate (rem/h), tungsten powder density = 15.6 g/cm^3

	neutron	neutron	neutron	photon	photon	photon
material	**5 MeV**	**1MeV**	**0.1 MeV**	**5 MeV**	**1MeV**	**0.1 MeV**
iron	**10.0 +/- 0.1%**	**10.3 +/- 1.6%**	**11.5 +/- 6%**	**0.039 +/- 0.6%**	**0.093 +/- 2.0%**	**0.117 +/- 0.4%**
Iron + plastic	**0.11 +/- 3.4%**	**0.093 +/- 9.2%**	**0.114 +/- 5.5%**	**0.063 +/- 0.7%**	**0.139 +/- 1.1%**	**0.419 +/- 1.6%**
tungsten powder	**9.37 +/- 0.9%**	**9.78 +/- 0.9%**	**9.82 +/- 18.9%**	**0.0010 +/- 10.3%**	**0.043 +/- 1.3%**	**0.049 +/- 6.6%**
tungsten powder + plastic	**0.52 +/- 15.3%**	**0.627 +/- 8.7%**	**0.611 +/- 13%**	**0.0052 +/- 8.3%**	**0.100 +/- 1.1%**	**0.183 +/- 3.9%**