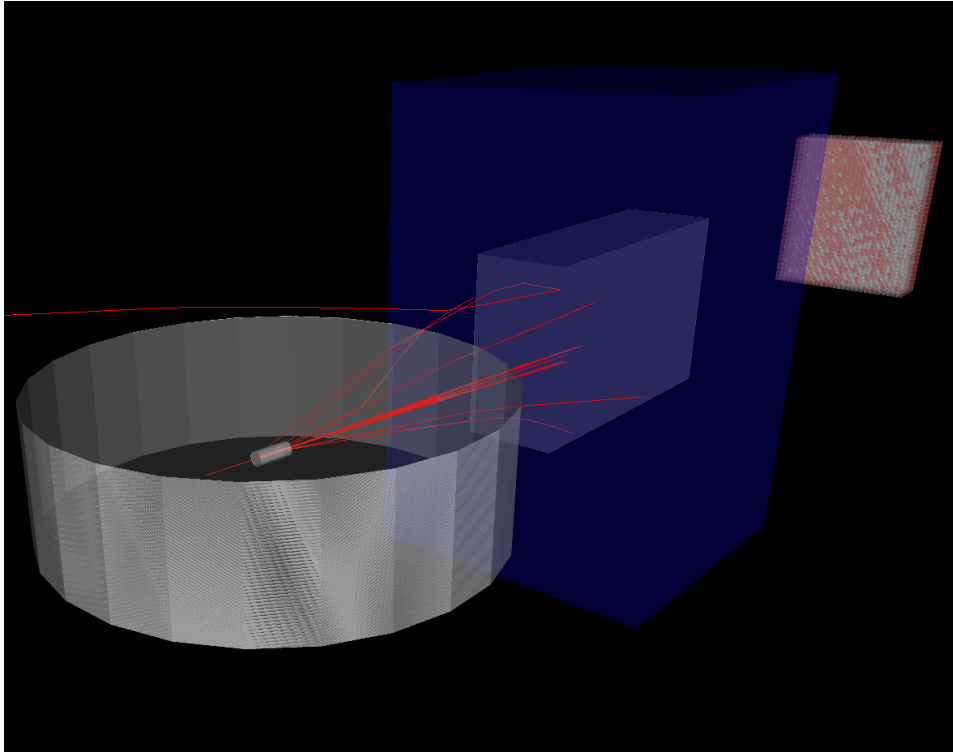
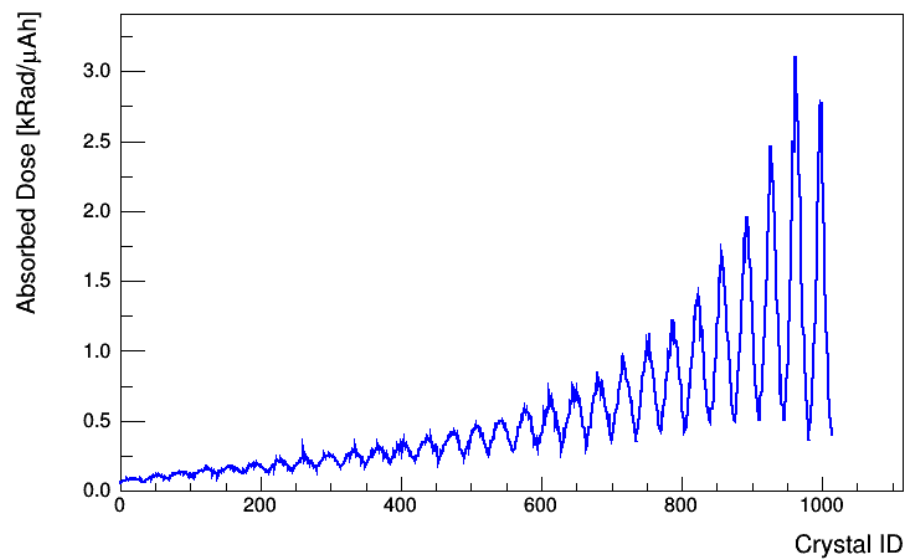
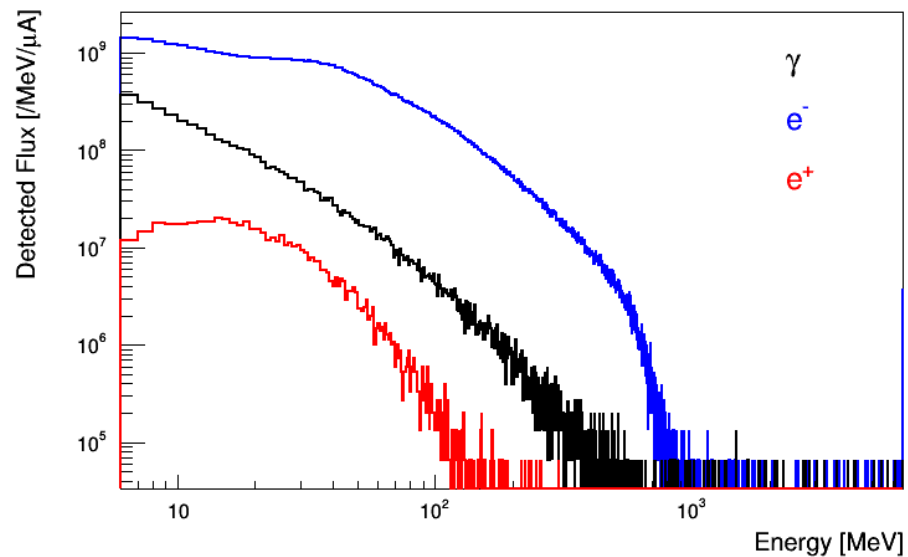


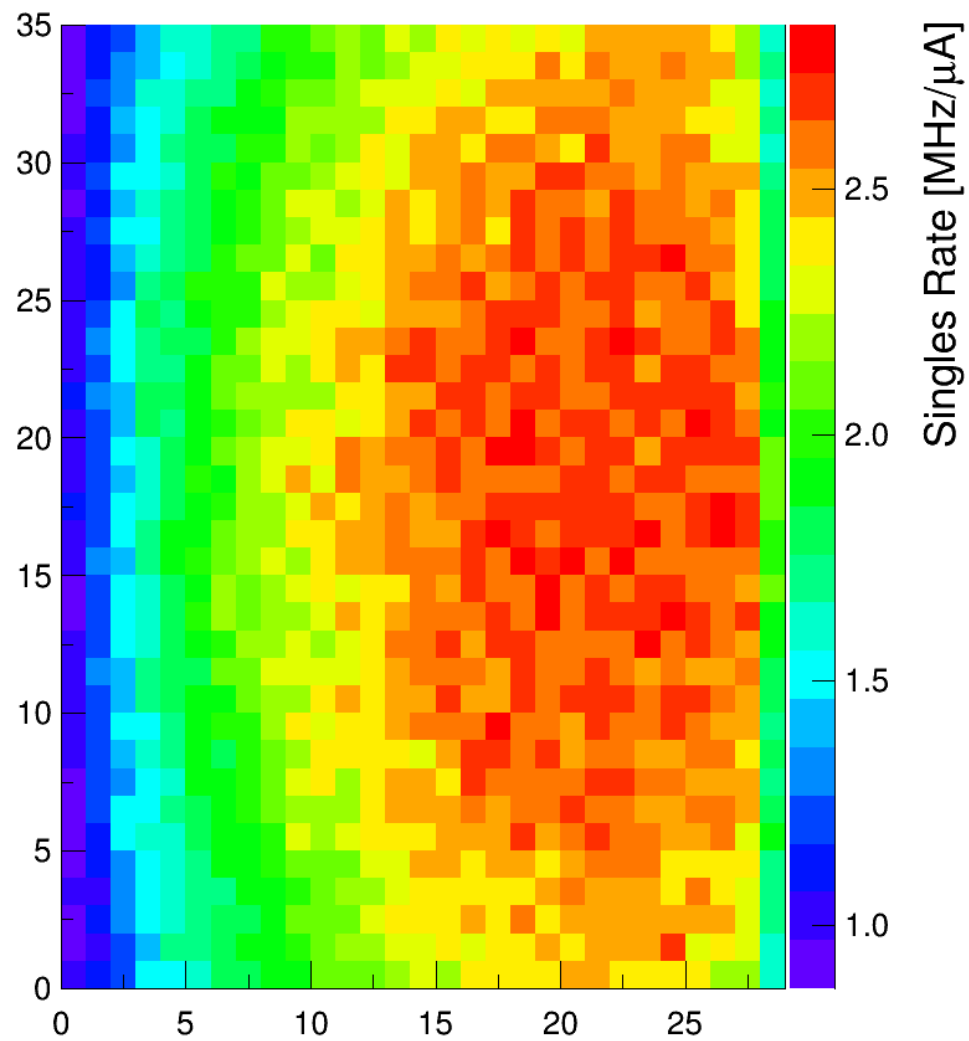
Geant4 Background Simulations for NPS Experiments (New Deflection Magnet Design)

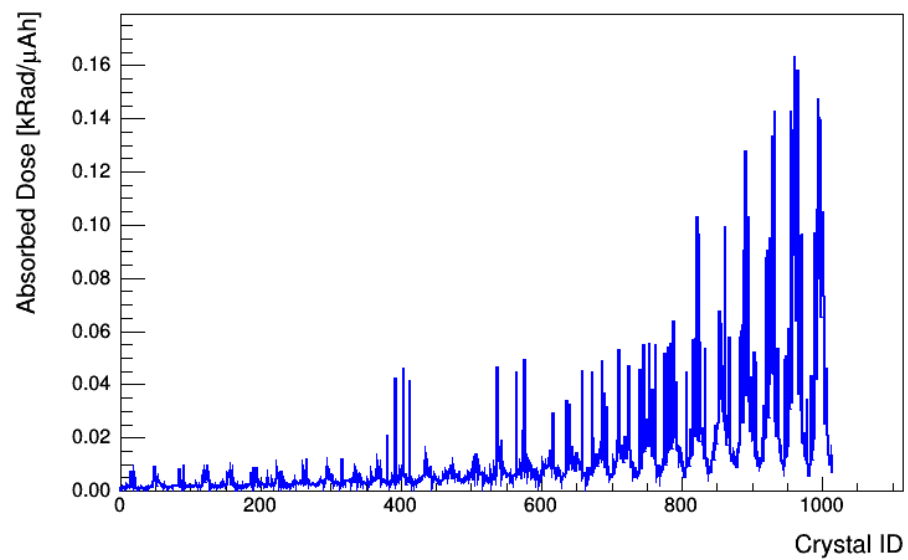
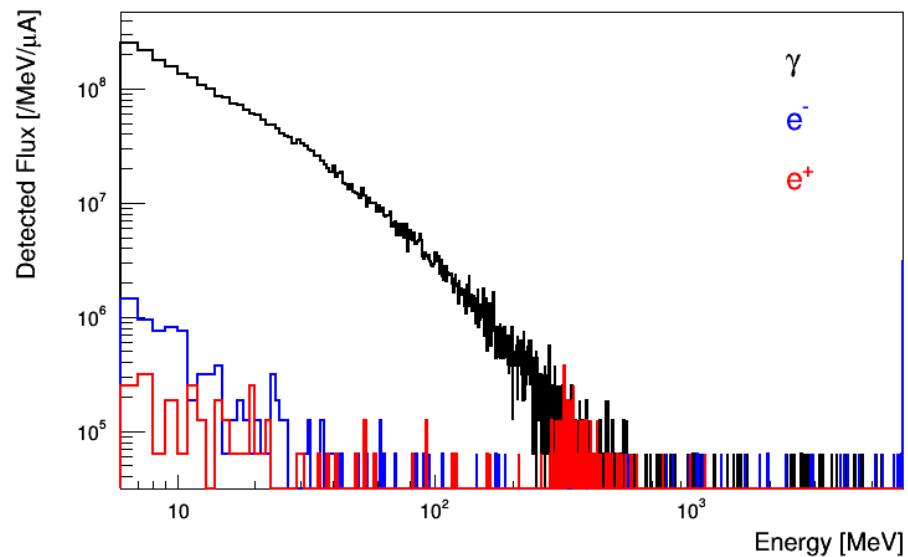


- 6.6 GeV rastered beam on 10 cm LH_2
- Target cell and geometry included
- Electromagnetic interactions only
- No particle tracking below 5 MeV
- No particle tracking in downstream beamline
- Uniform magnetic field in aperture only
- No field clamps or coil geometry
- Magnet and NPS at 6.3 degrees
- Distance to magnet centre = 1.57 m
- Distance to front-face of NPS = 4.0 m
- Signal integration time in NPS = 15 ns
- Relatively low statistics = 3000 CPU hours
- Results scaled to 1 μA

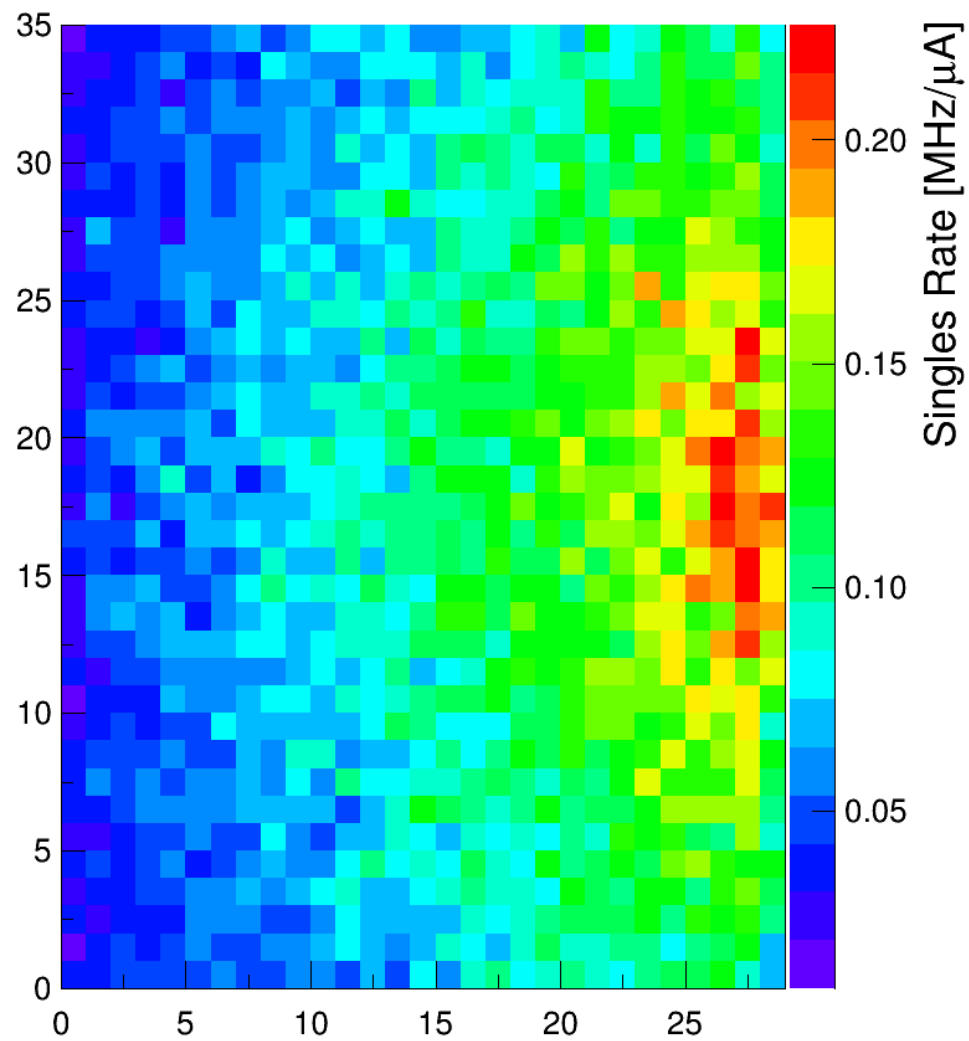


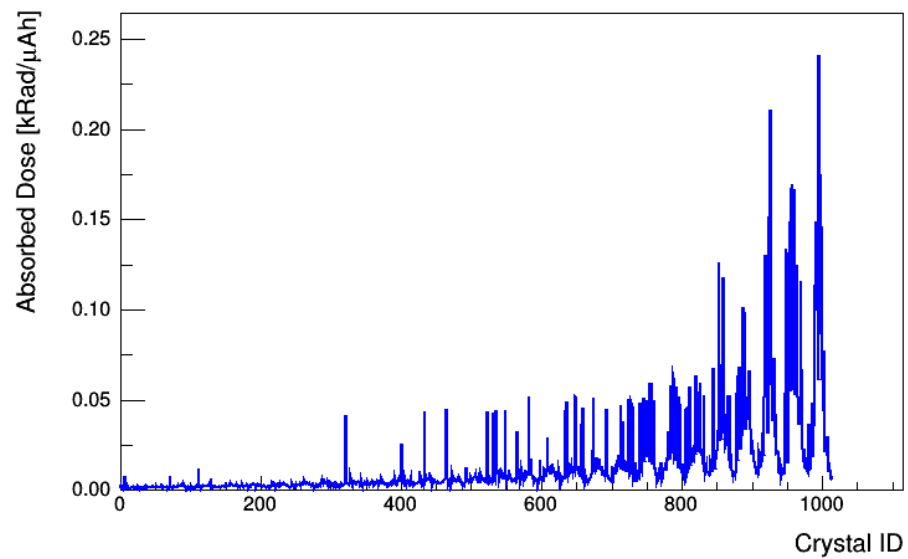
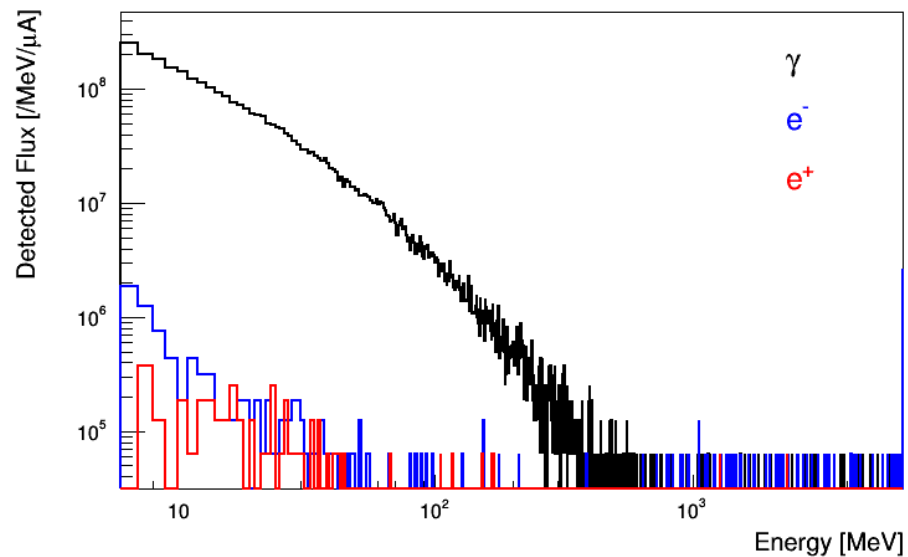
Magnet Off



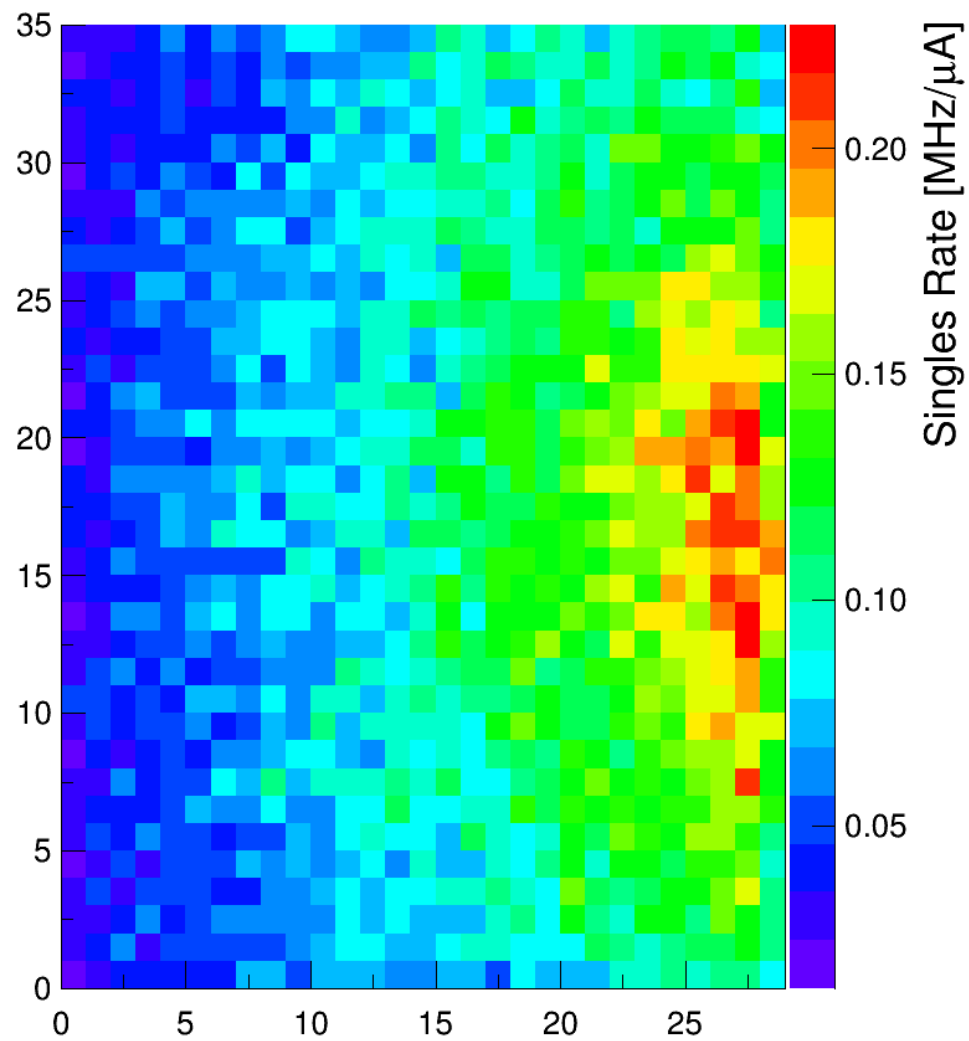


V Field 0.3 Tm





H Field 0.6 Tm



	Magnet Off	Vertical Field (0.3 Tm)	Horizontal Field (0.6 Tm)
Average Dose Rate per Crystal [Rad/ μ Ah]	500	14	15
Max Dose Rate per Crystal [Rad/ μ Ah]	2900	160	240
Average Singles Rate per Crystal [MHz/ μ A]	1.9	0.09	0.1
Max Singles Rate per Crystal [MHz/ μ A]	2.7	0.23	0.23

- Factor of 10 – 15 improvement in maximum rates for Magnet Off vs. 0.3 Tm Vertical Field.
- Vertical and Horizontal Field configuration rates are similar.
- BUT, the fact we have only electromagnetic interactions in the target and relatively low statistics means there is almost no contribution to the rates from particles with energies > 1 GeV.