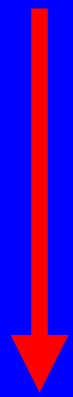
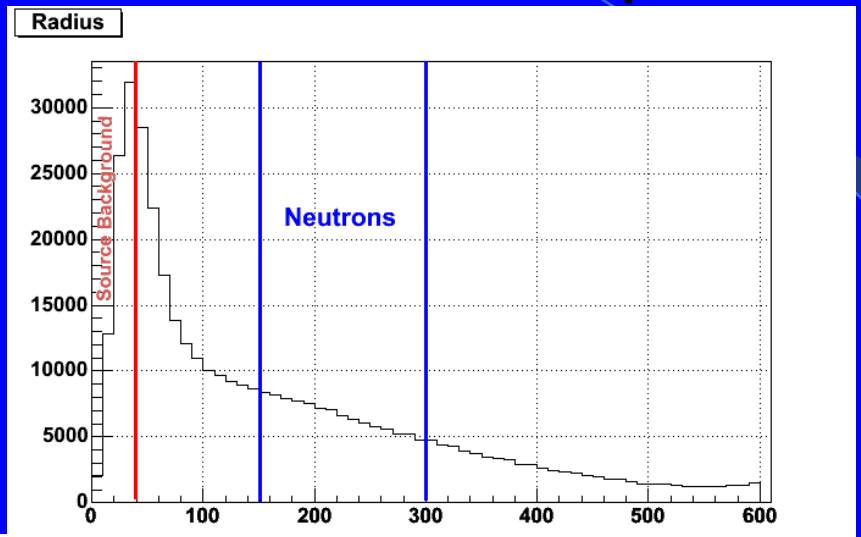
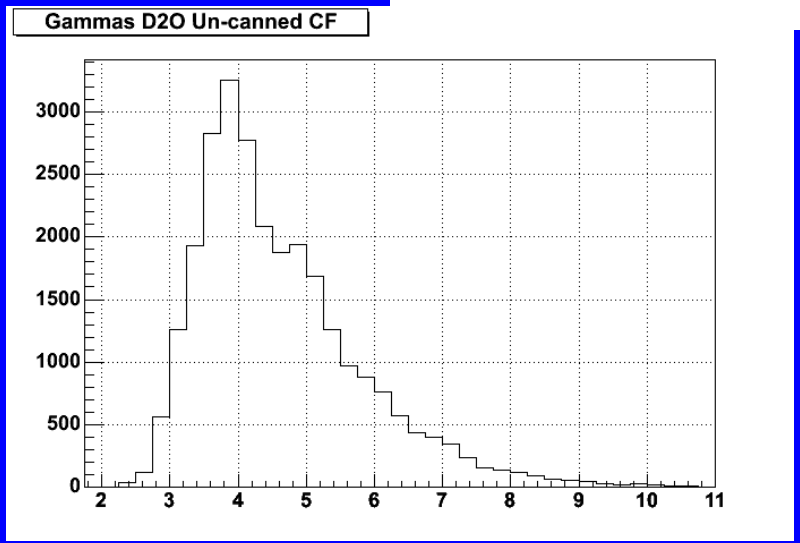
1. Neutron Capture Efficiency in D2O Phase

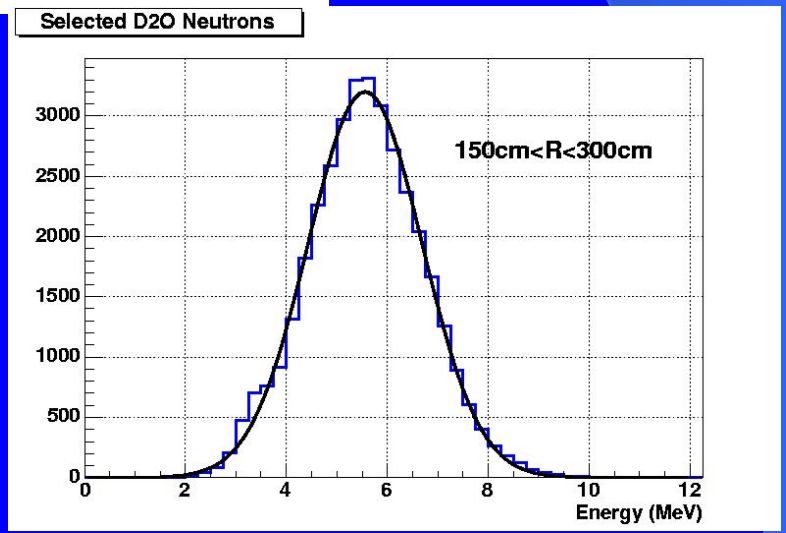


2. Determining Source Background Correction to Salt Phase Efficiency

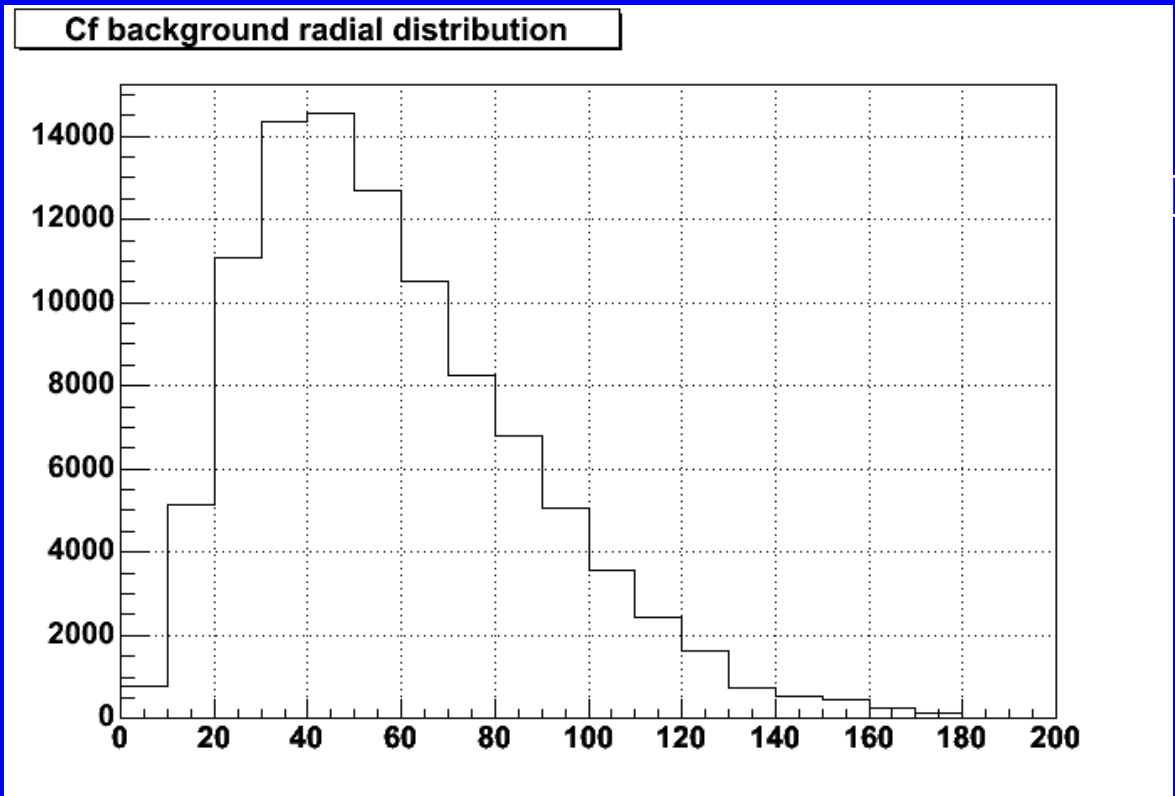
Pure D2O Neutron Capture Efficiency







Source Background Radial Distribution

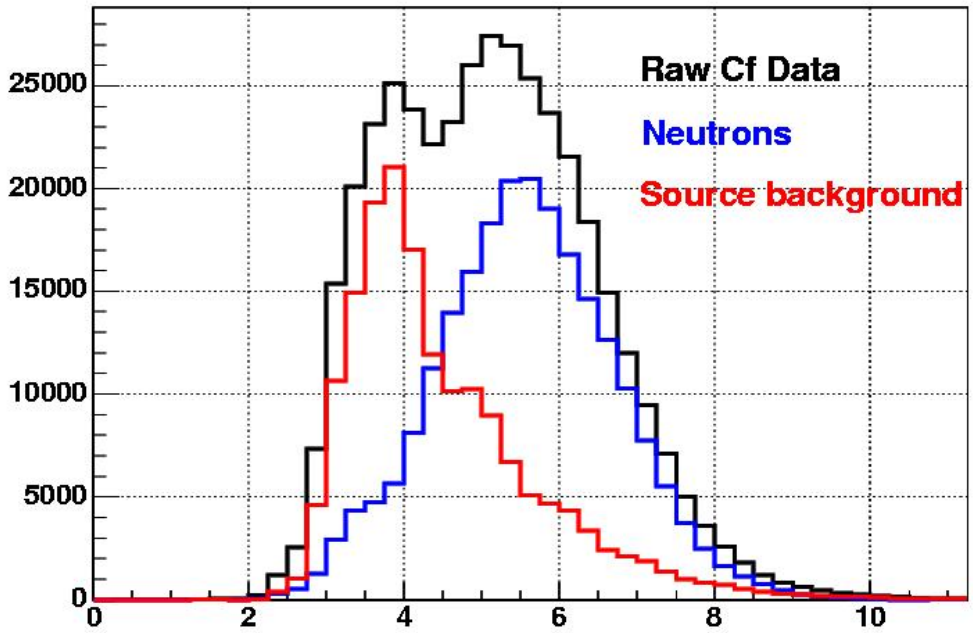


Data-MC subtraction

Determining Efficiency

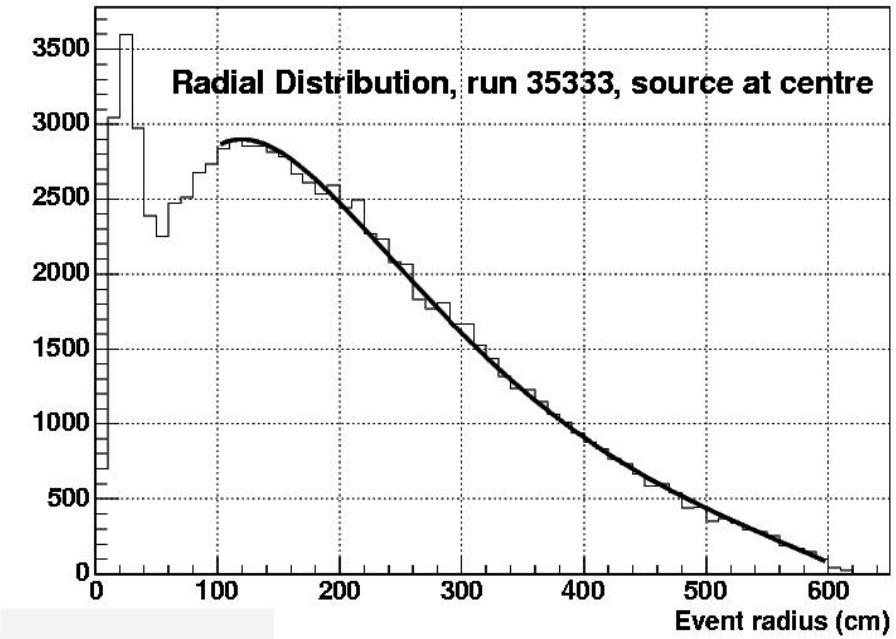
Selected neutron energy distribution is used to extrapolate raw Cf energy above 7MeV down to 0MeV

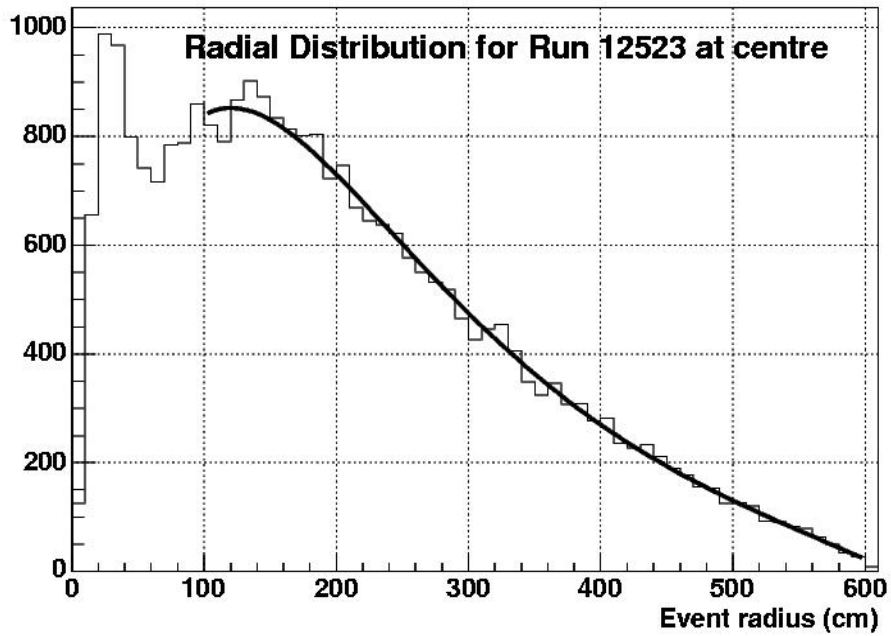
Then apply correction for fraction of gammas above 7MeV



$$\epsilon = N_{Raw,7MeV} \frac{N_{clean}}{N_{clean,7MeV}} \frac{C_{7MeV}}{RT}$$

Radial Distributions





$$\Phi(r) = Ar^2\left(\exp\left(\frac{2R}{L}\right)\frac{\exp\left(\frac{-r}{L}\right)}{r} - \frac{\exp\left(\frac{r}{L}\right)}{r}\right)$$

Fit to point source diffusion model

Diffusion lengths are within 0.4%

	Run 12523	Run 35333 uncanned	Run 35369 canned
Efficiency	48.9%	(50.7 +/- 1.4)%	49.6%
Diffusion Length	(120.3+/-1.1)cm	(119.8 +/- 0.6)cm	
Effective Radius (from fit)	(620 +/- 4)cm	(620 +/- 2)cm	

Use Fission Gamma Energy Background from Pure D2O to Determine Efficiency Correction in Salt

	Correction
NC energy neutrons	+(1.0+/-0.1)%
(n,2n)	-(0.98+/-0.10)%
Energy + 5.5cm shift	**-(1.2 +/- 0.3)%**
Source gamma fraction	-(1.1 +/- 1.0)% **-(3.8 +/- 0.1)%**

Results of Correction

	Previous	**New**
NC Flux	4.90	**5.03**
Neutron Capture Uncertainty	3.4	**3.2**