

Recent Experimental Activities at LANSCE on Pt Capture Cross Sections



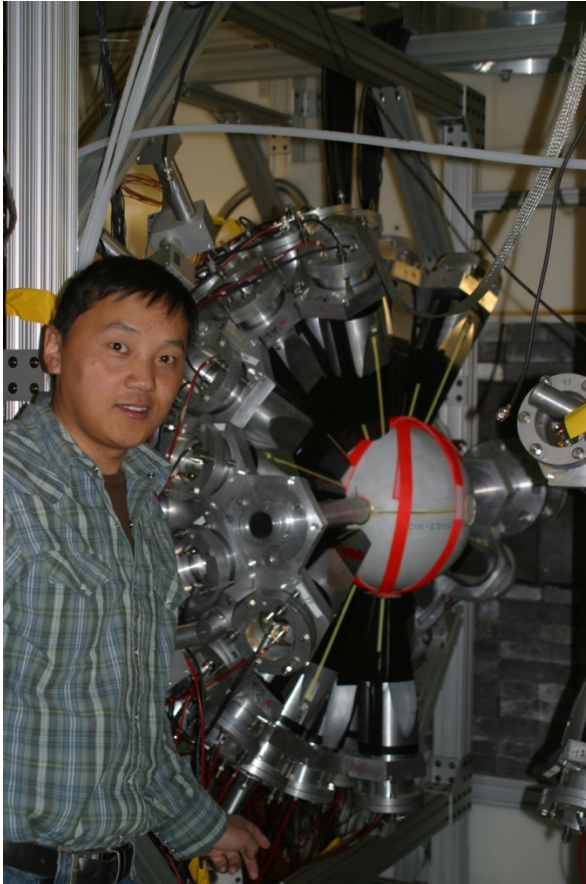
Cathleen Fry

11/4/2019

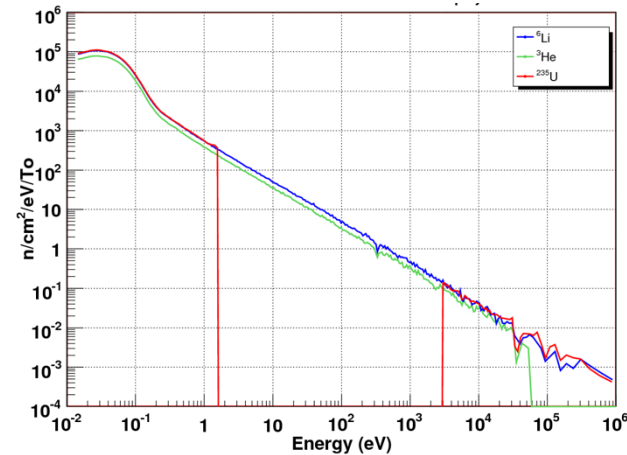


Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

Detector for Advanced Neutron Capture Experiments



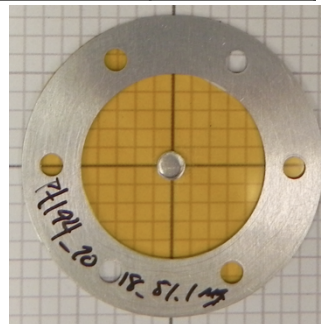
- Nearly 4π coverage ($\approx 3.5\pi$)
- 160 BaF₂ crystals - 4 different shapes
- High efficiency for γ detection - collect total energy
- Highly segmented - high rates
- ⁶LiH inner sphere to absorb scattered neutrons
- 20.25 m from water moderator
- LANSCE spallation source – 800 MeV p @ 100 μ A



Samples and run times

	Composition (%)					
	190	192	194	195	196	198
^{192}Pt	0.01	56.93	26.34	11.12	4.77	0.83
^{194}Pt	0.01	0.03	96.45	2.46	0.87	0.18
^{195}Pt	0.01	0.01	1.93	96.63	1.33	0.09
^{196}Pt	<0.01	0.01	1.45	3.55	94.57	0.42
^{198}Pt	<0.01	0.03	1.77	2.83	3.73	91.63
nat	0.01	0.78	32.86	33.78	25.21	7.38

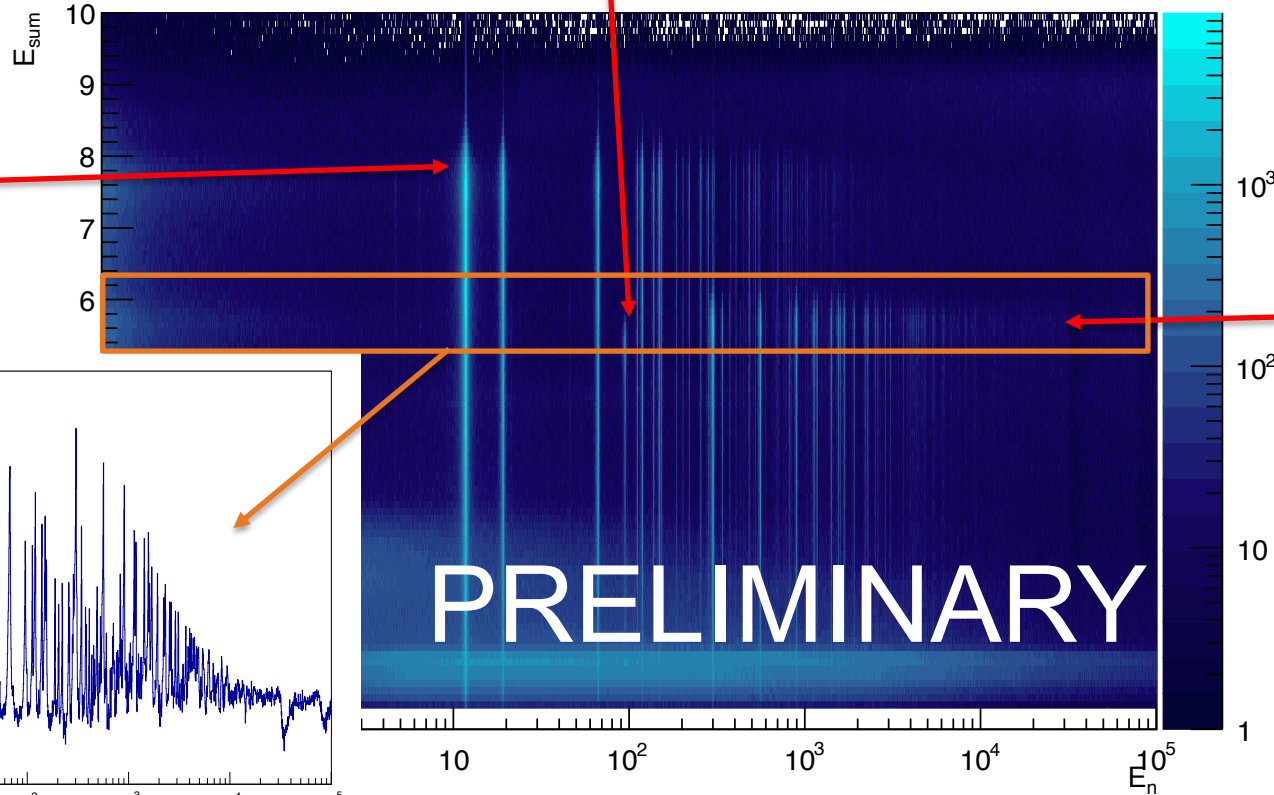
All fabricated samples were purchased from NIDC, each had 4mm diameter and was mounted on Kapton tape



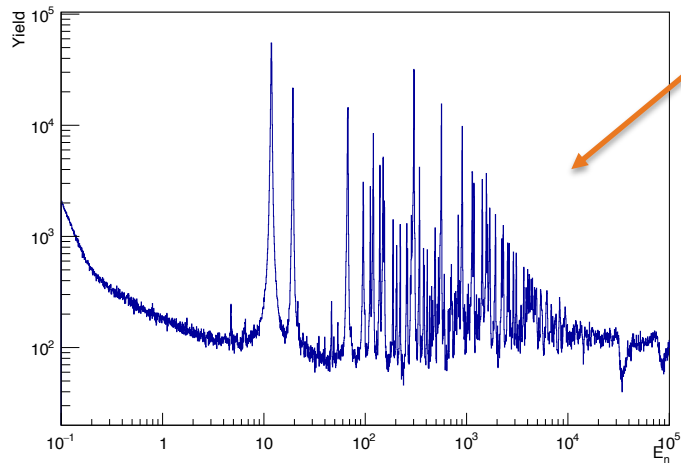
Sample	M/Y	Time (d)
194 50mg	10/18	4
194 10mg	10/18	1
195 50mg	10/18	4
195 10mg	10/18	1
196 50mg	10/18	1
196 10mg	10/18	1
195 50mg	9/19	1
192 20mg	9/19	3
196 50mg	9/19	4
196 10mg	9/19	1
198 57mg	9/19	4
198 10mg	9/19	1

Example data: ^{196}Pt (3.5% ^{195}Pt , 0.5% ^{198}Pt contamination)

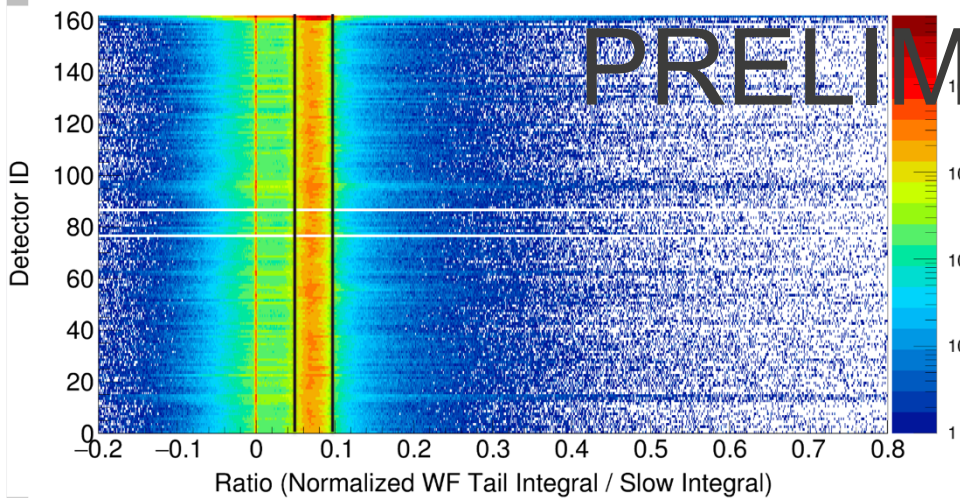
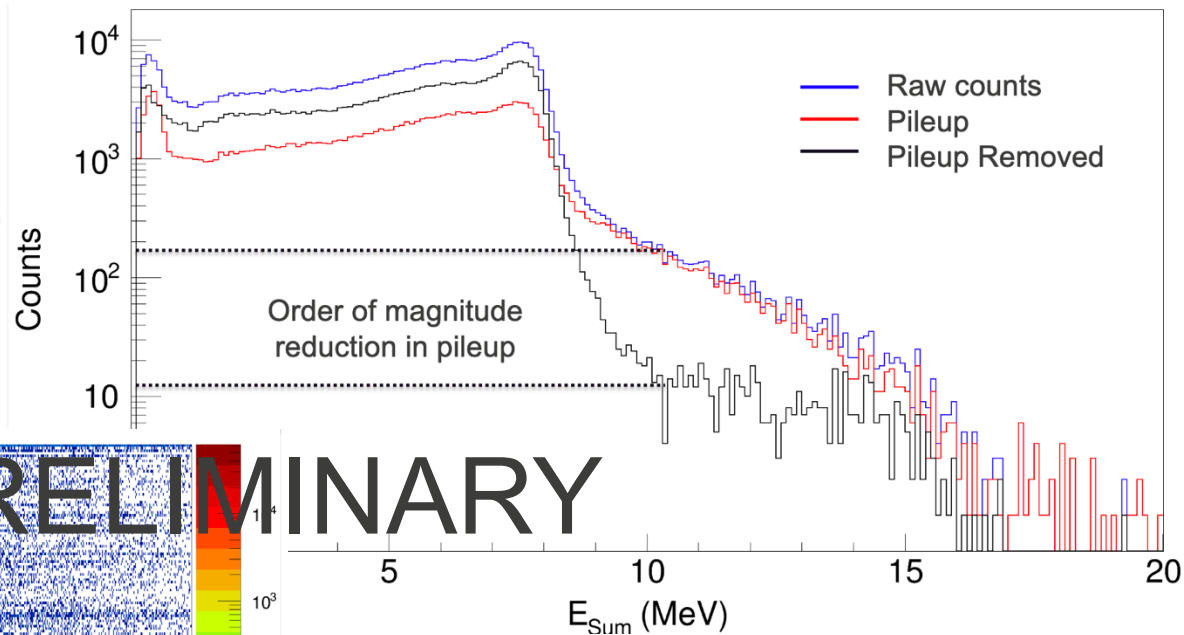
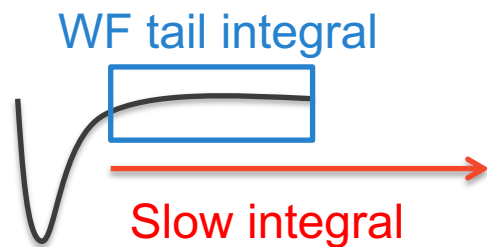
^{198}Pt contaminant line



^{196}Pt of interest



^{195}Pt first resonance pileup (Q=7.9 MeV)



Outlook

- Capture data on enriched samples of $^{192,194,195,196,198}\text{Pt}$ were taken recently at DANCE, as well as ^{208}Pb for scattering backgrounds and ^{197}Au for normalization
- Analysis is ongoing
 - Initial plan to get pointwise cross sections from ~ 1 eV to ~ 500 keV
 - Eventual plan to do resonance analysis