# FLAT-TOP – Passive Neutron Spectrometer

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IER-252 Neutron Spectrometry Requirements

- ## Passive BSS used in IER-147:
  - ### Logistically difficult (then and now)
  - ### Simplistic result (isotropic)
  - ### Repeatability (normalisation) is essential
- ## RoSpec also deployed (in both) – limited:
  - ### Throws it's toys out of the pram > several mSv
  - ### 'Black box' analysis (also antiquated)
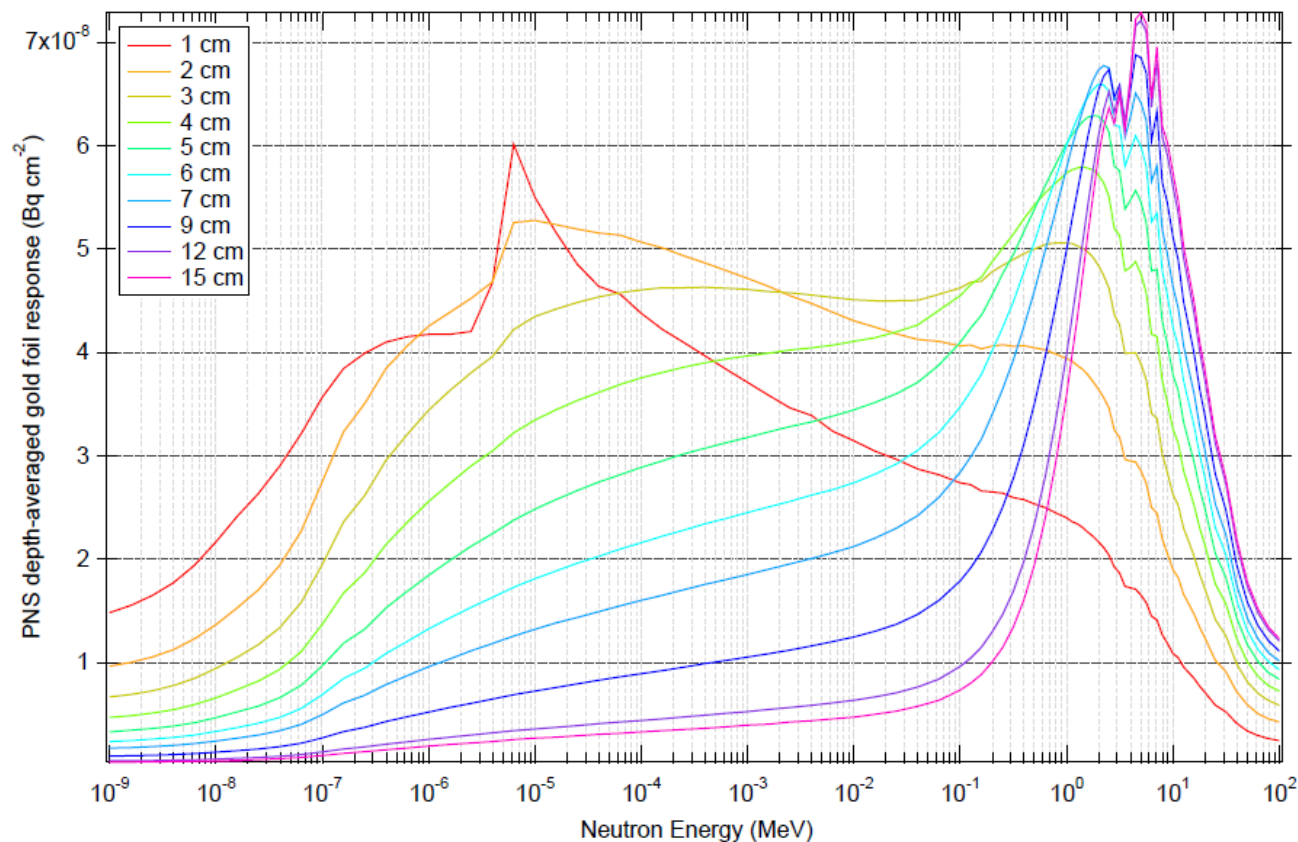- ## Solution: consolidate 9 BSs into 1 sphere
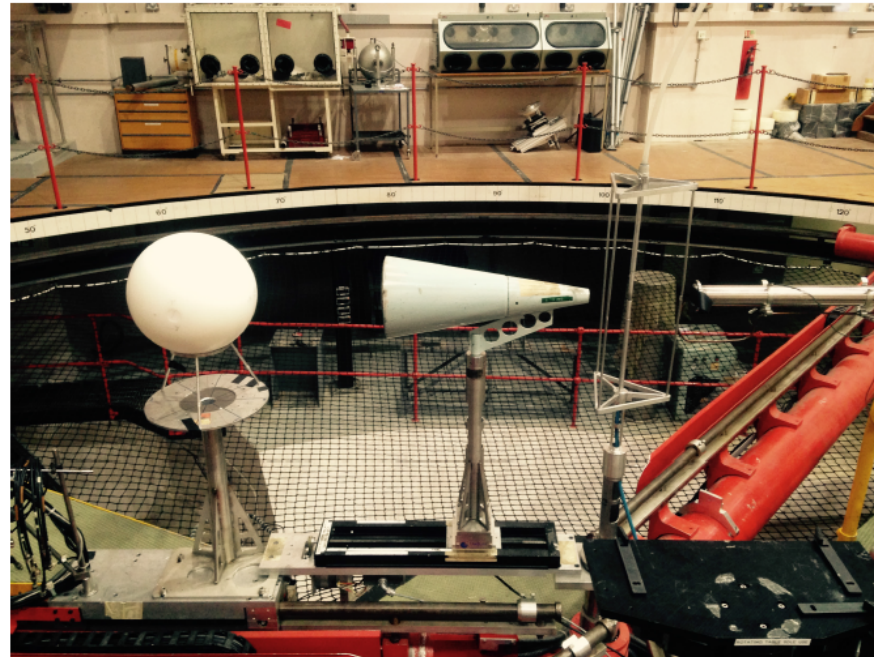
Sphere design
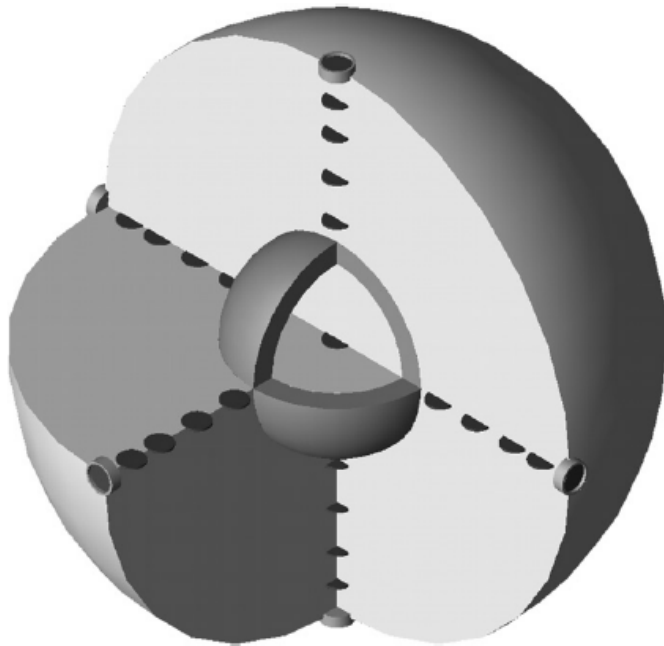
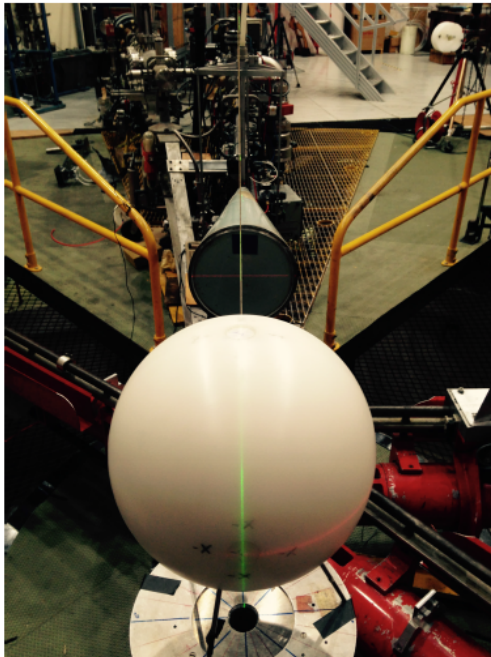- *Gomez-Ros, et al.*
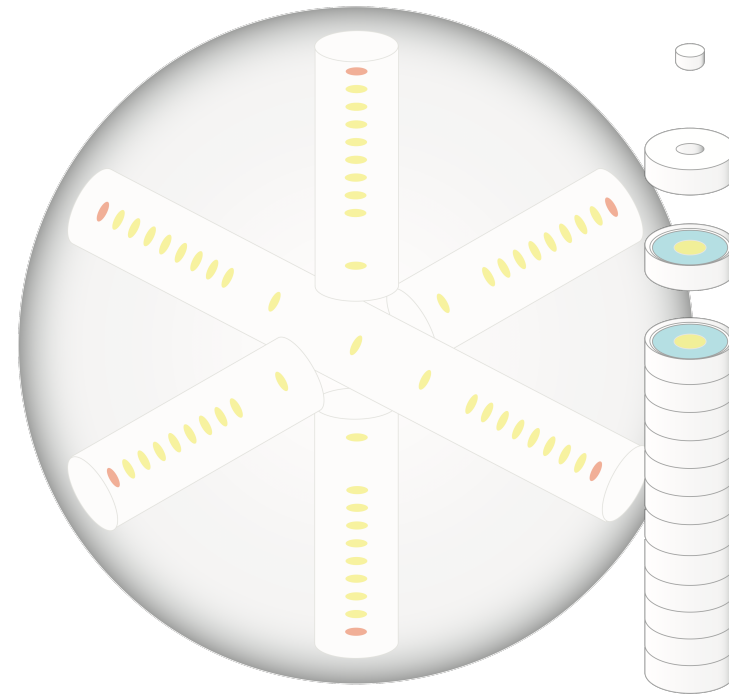
- AWE PNS

PNS Response functions
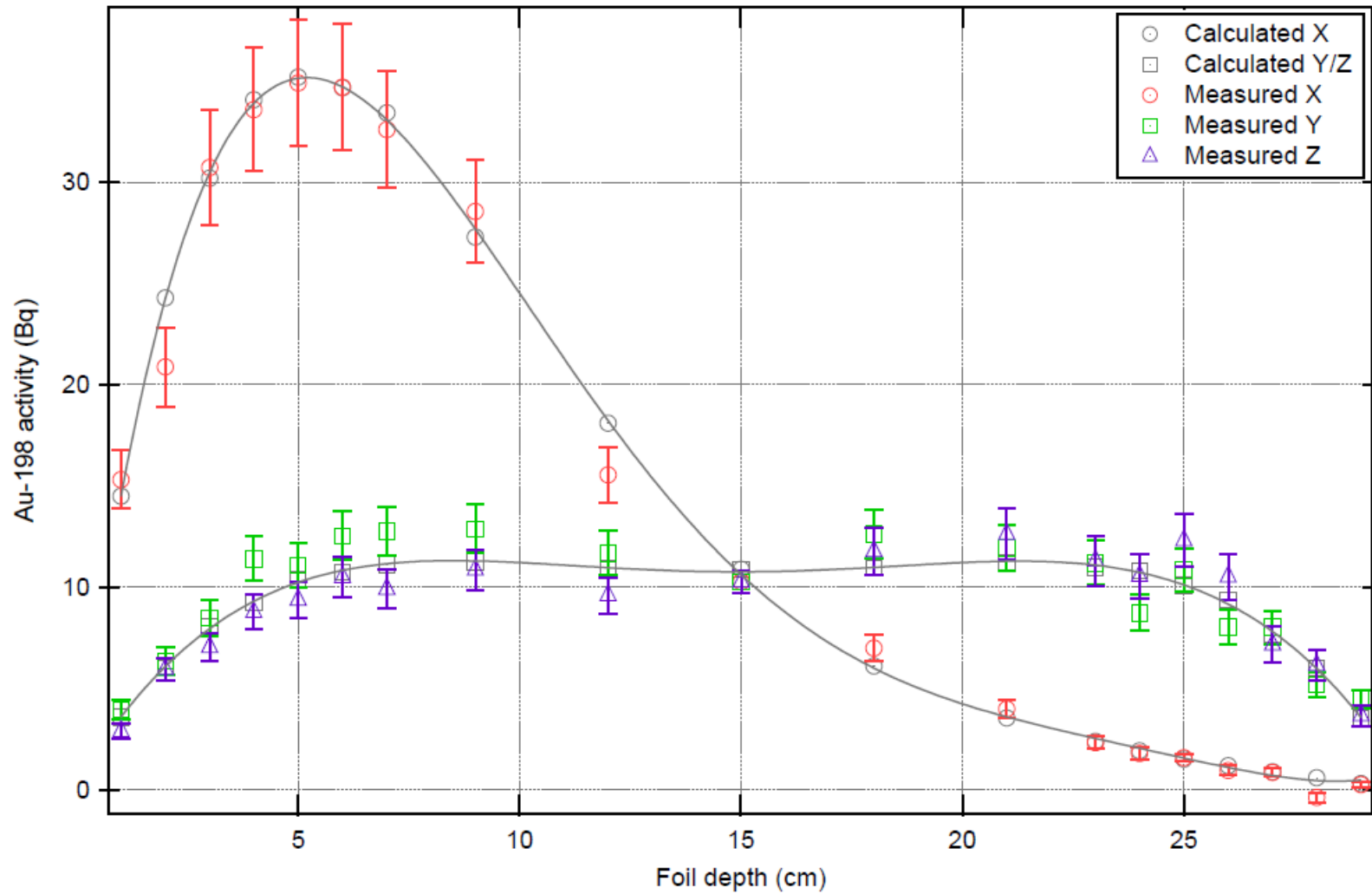
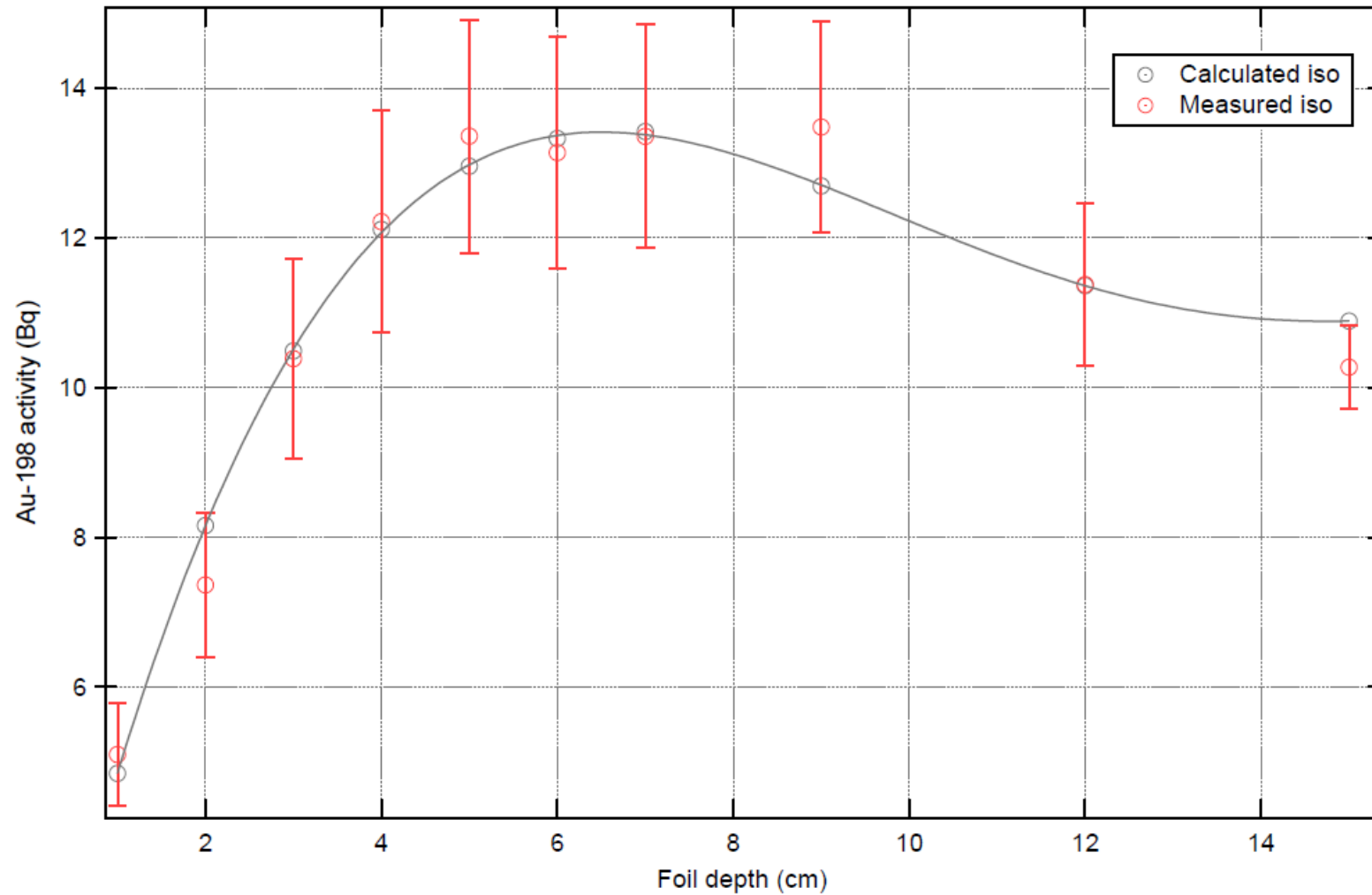- Plane-parallel source (measurements ideally >2m)
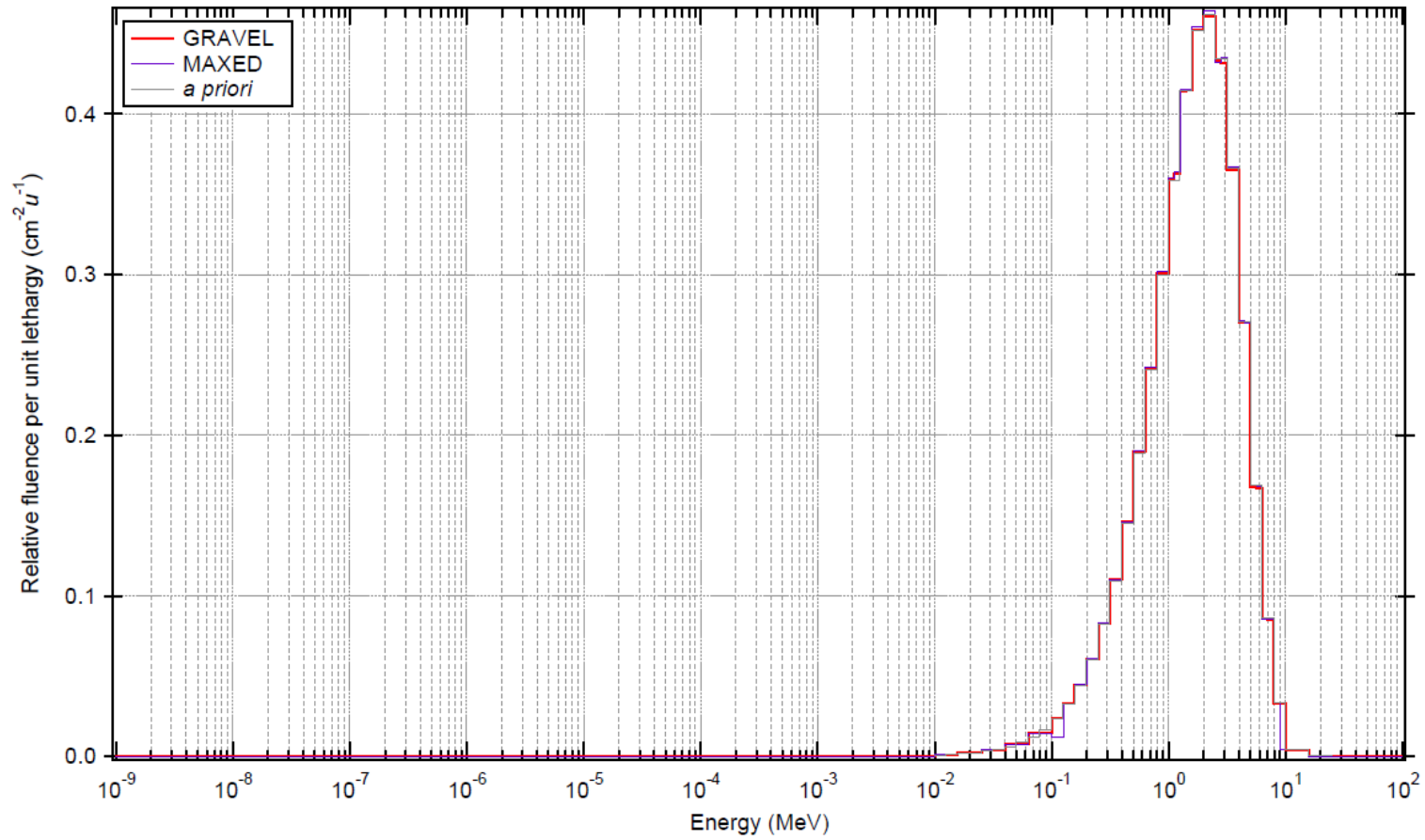
NPL Validation Irradiations

- Cf, 565 keV

Cf, directional

Cf, isotropic

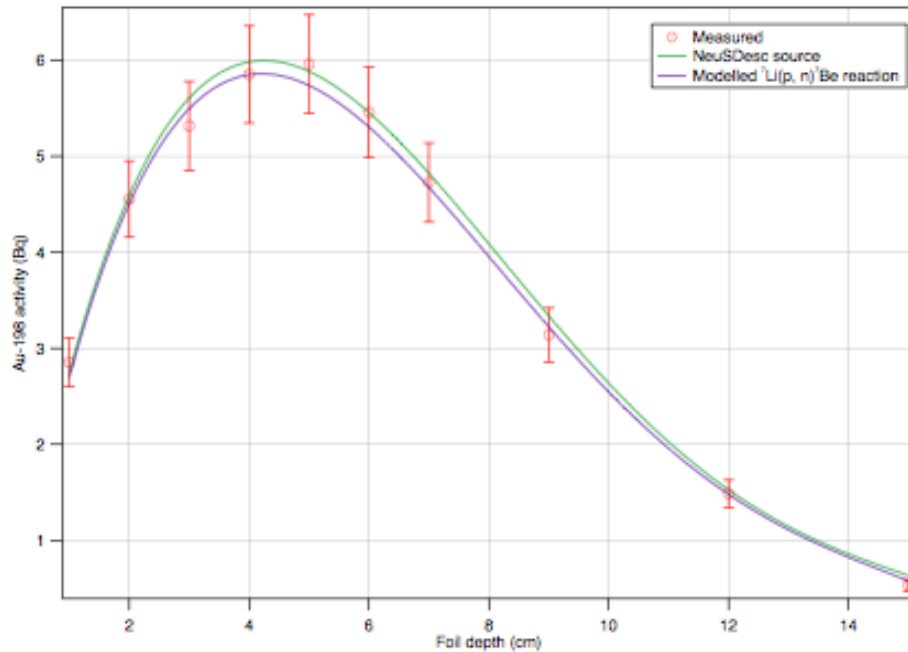| Source	Fluence (cm^{-2})	Ambient Dose (mSv)	1σ Uncertainty (mSv)
GRAVEL	2.22 x 10^8	85.77	$\pm$ 8.58
MAXED	2.26 x 10^8	87.13	$\pm$ 8.71
NPL	2.25 x 10^8	85.31	$\pm$ 5.97

565 keV, X-axis
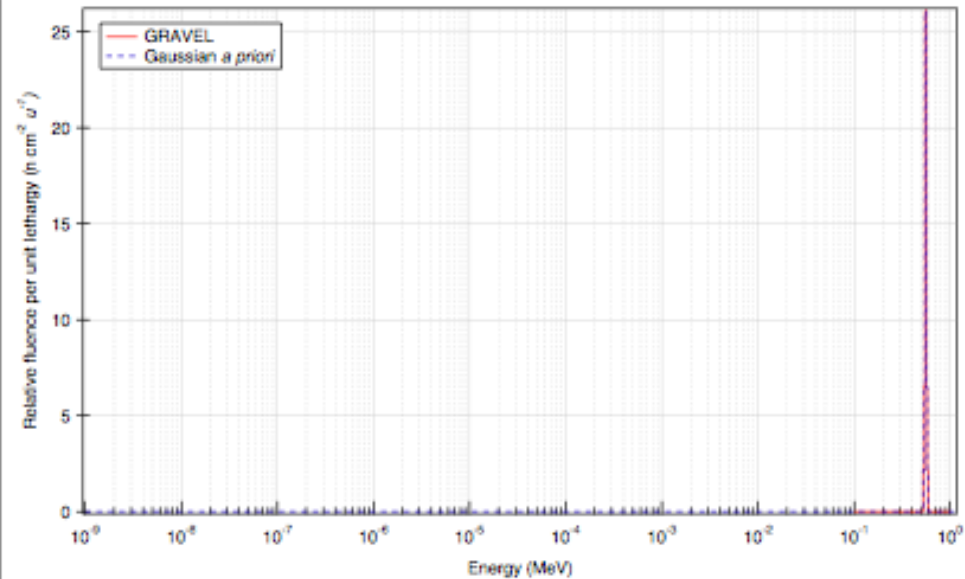
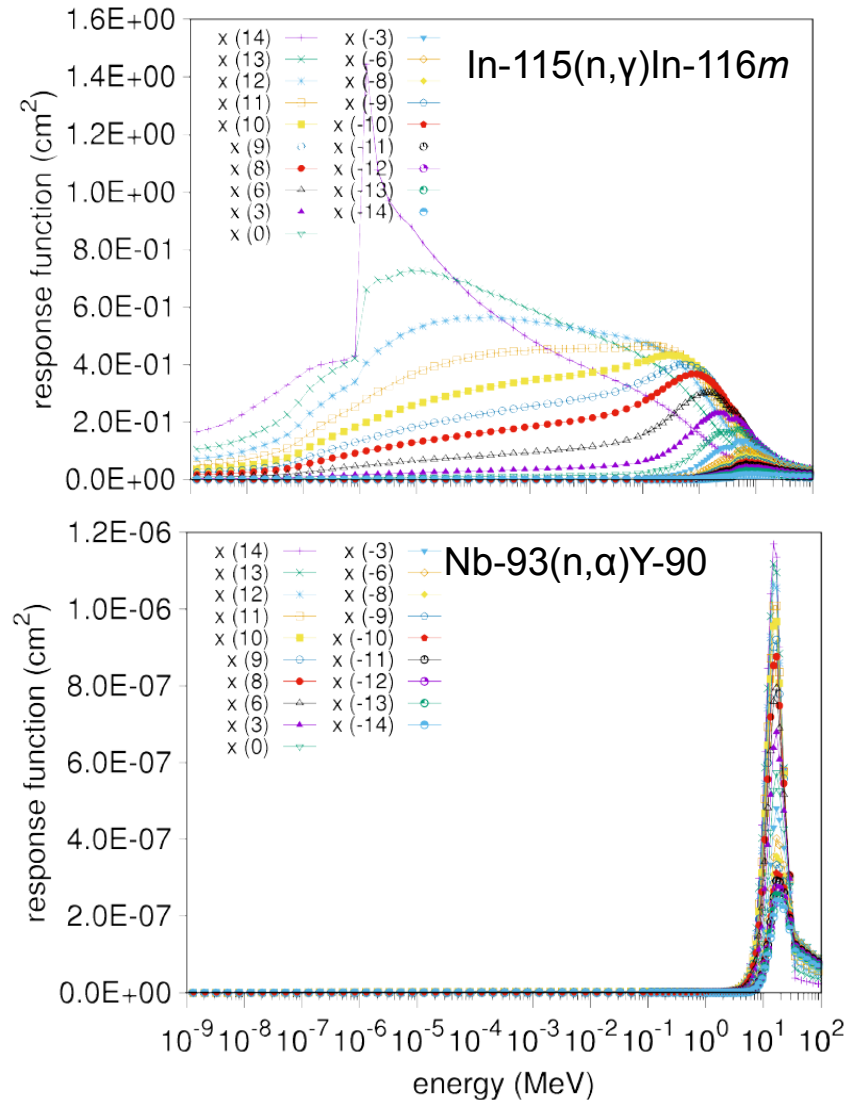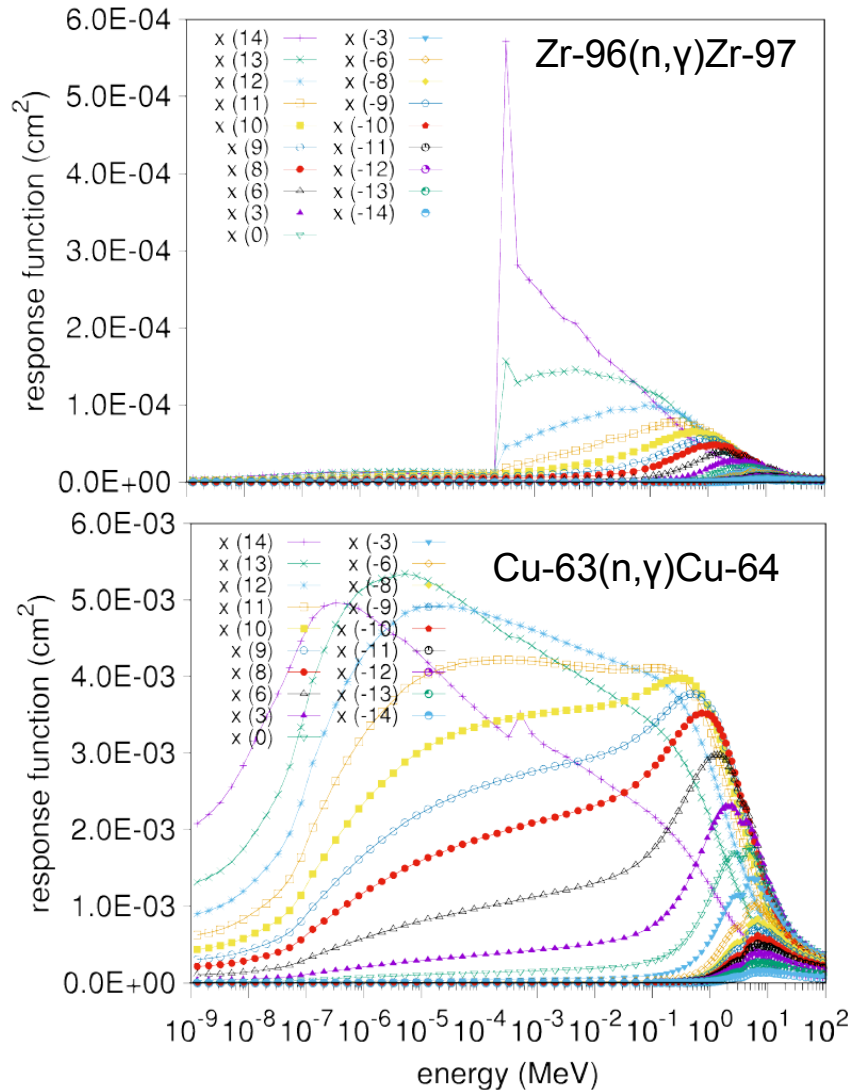| Source	Fluence (cm^{-2})	2σ Uncertainty (cm^{-2})
GRAVEL	3.13x10^{7}	± 0.31x10^{7}
NPL	2.92x10^{7}	± 0.14x10^{7}

- NPL NeuSDesc card
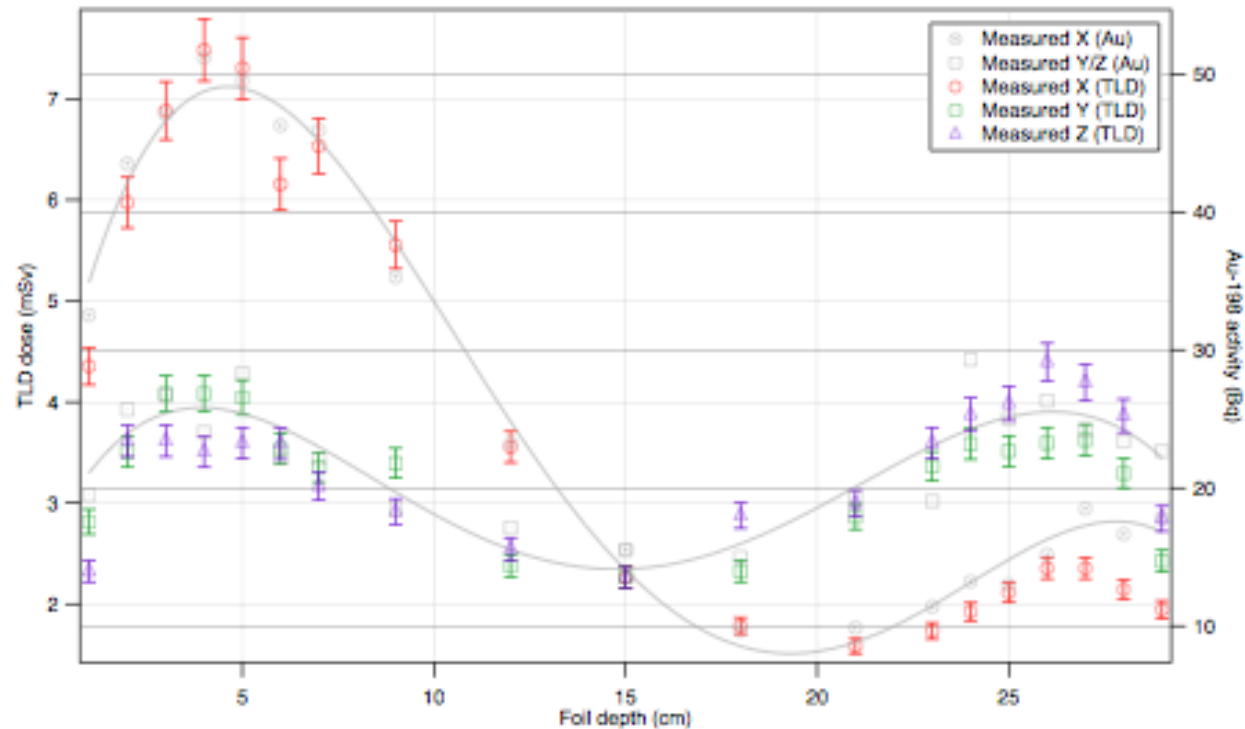- CCFE facility model

Additional work: directionality
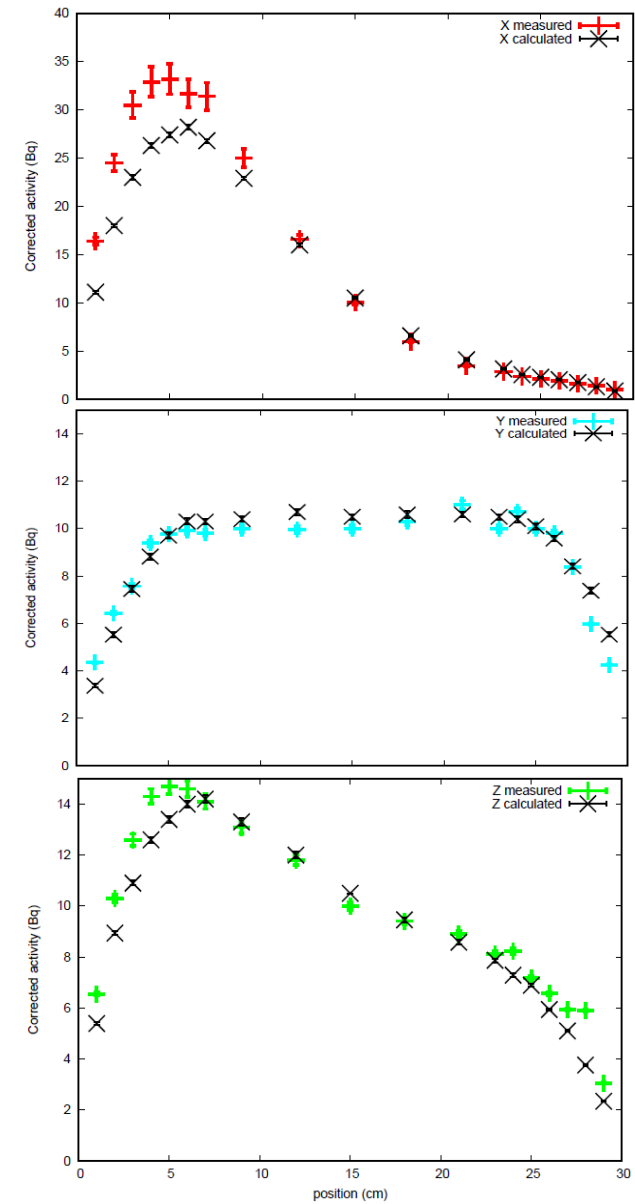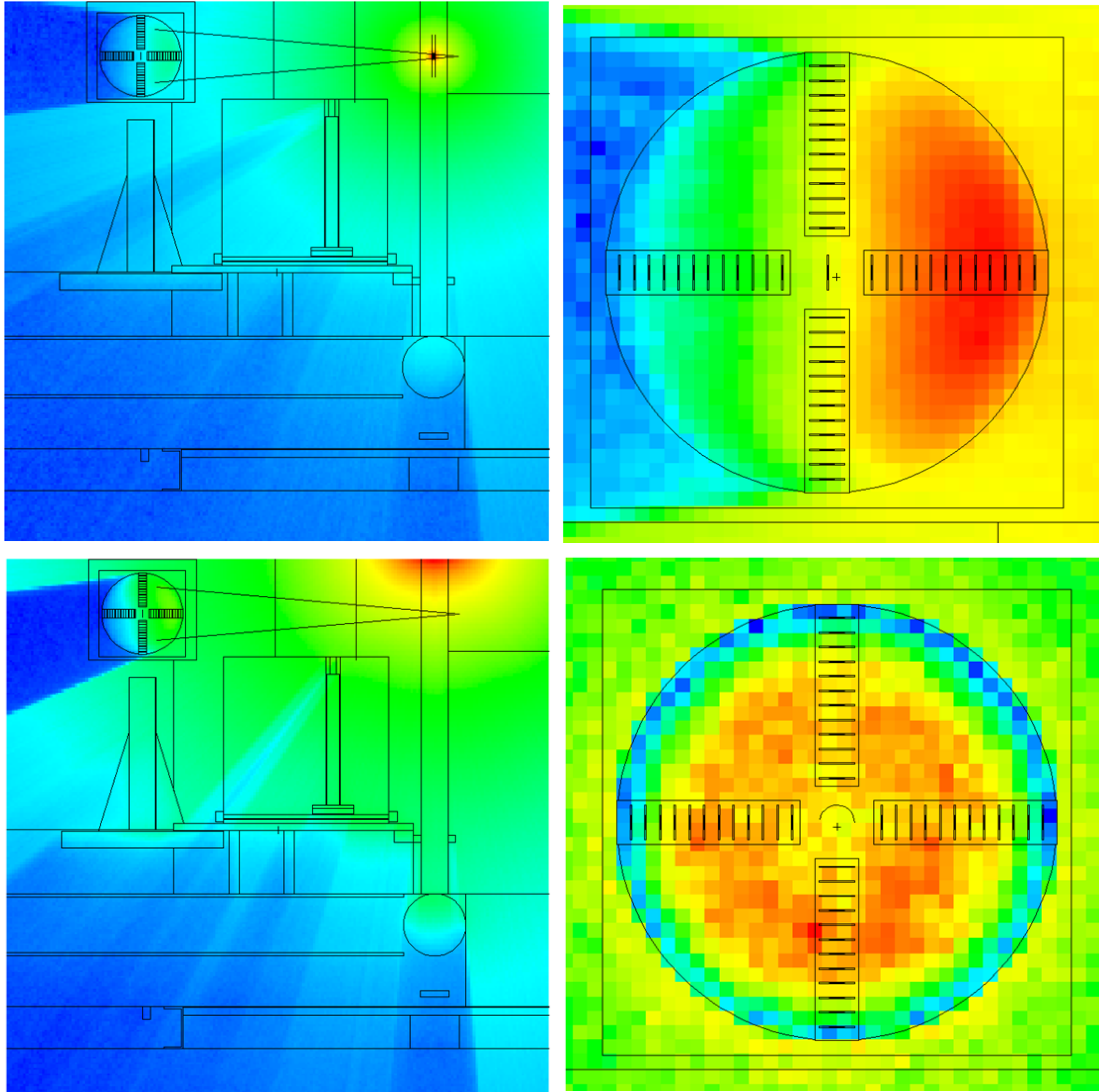
Additional work: Mixed loading

- Additional work: TLD loading

- Neutron-sensitive extremity TLDs
- Data can be acquired in much weaker fields

Thank you for listening
Thank you to the NCSP for experimental opportunities and related funding