Los Alamos
NATIONAL LABORATORY

# SPIDER: Independent Fission Product Yields from 0.5-20 MeV

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LANL P3 Low Energy Nuclear Physics

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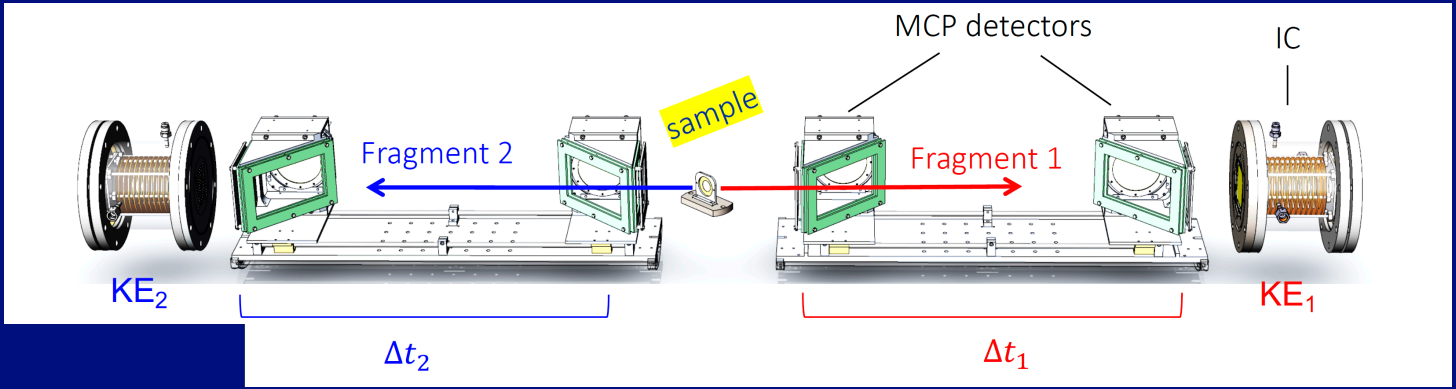
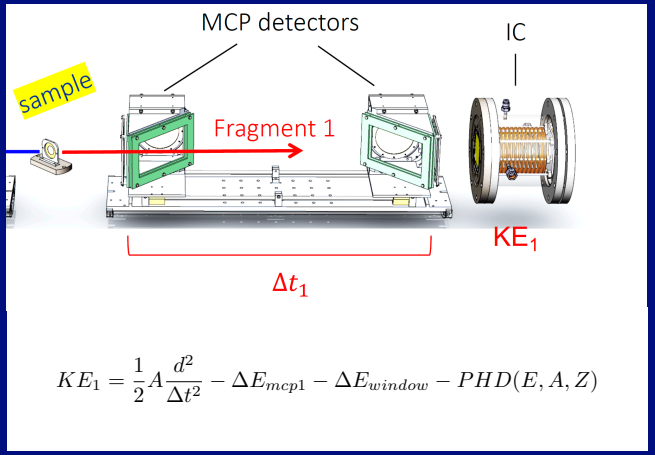
# 2E-2V FPY's with SPIDER

- 2E-2v: Mass $\propto$ (E)*(TOF)$^2$
- Goal <1 AMU mass resolution, fast neutrons, well-understood uncertainty/covariance
- Challenges: resolution, calibration, scalability

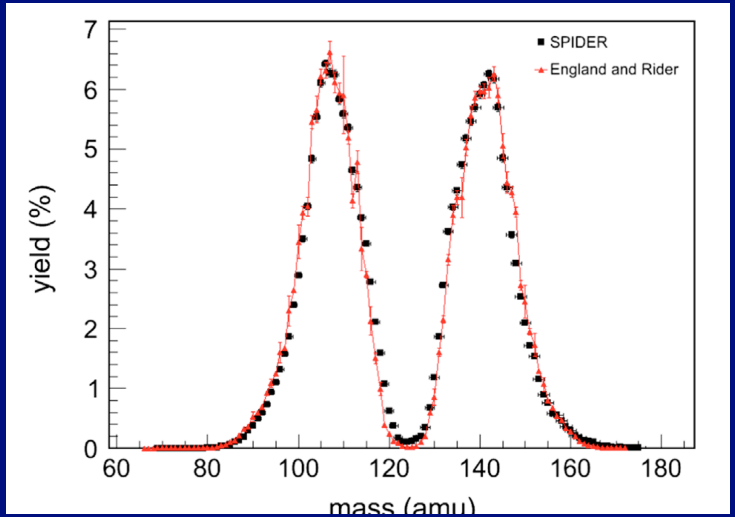


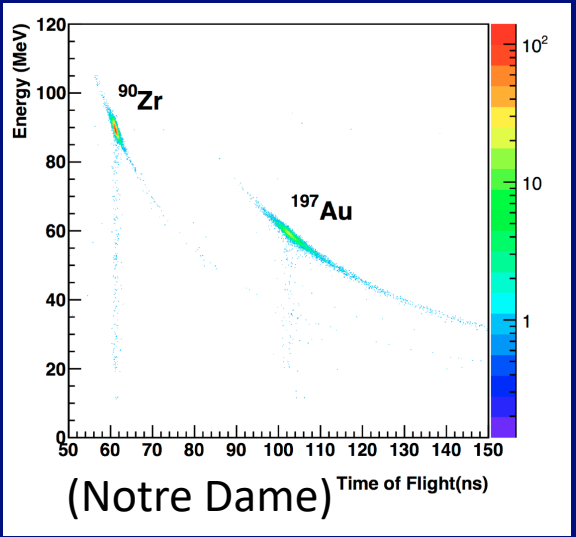
# SPIDER - Calibration Issues

- Unknown calibration, energy loss, and PHD
- Calibration depends on A,Z,E
- Calibration at external facility?
- Calibration with 252Cf?



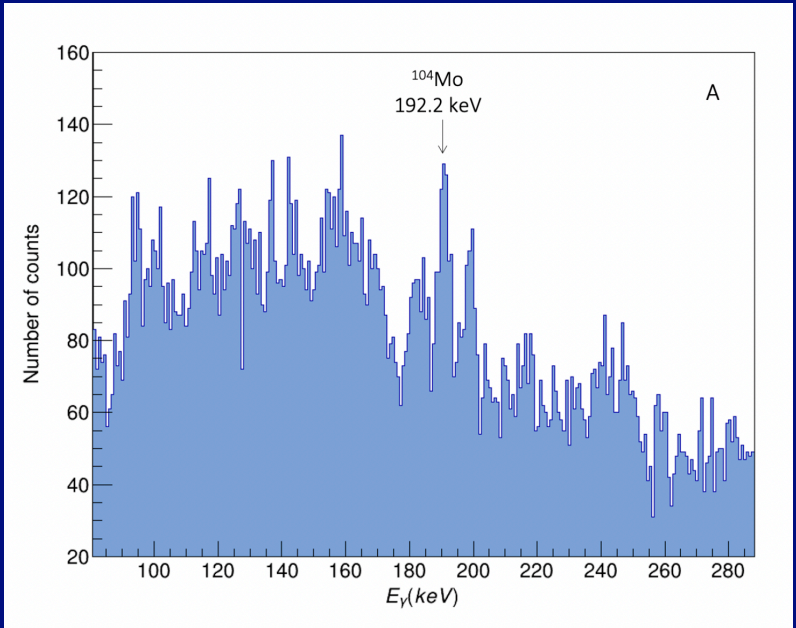

$$KE_1 = \frac{1}{2}A\frac{d^2}{\Delta t^2} - \Delta E_{mcp1} - \Delta E_{window} - PHD(E,A,Z)$$

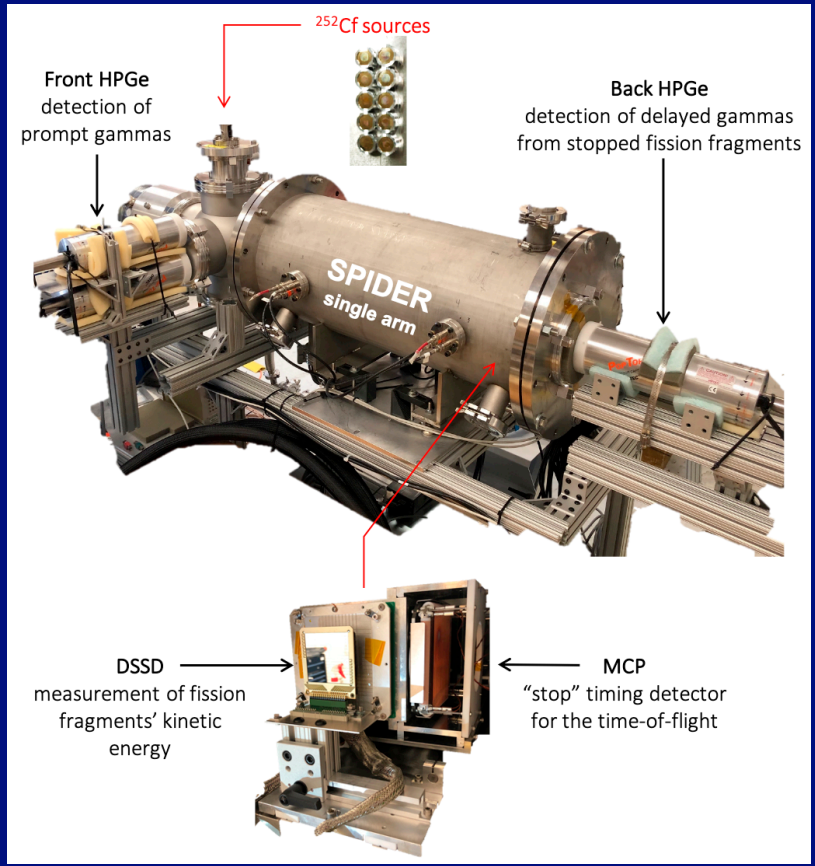


# SPIDER - Calibration Issues

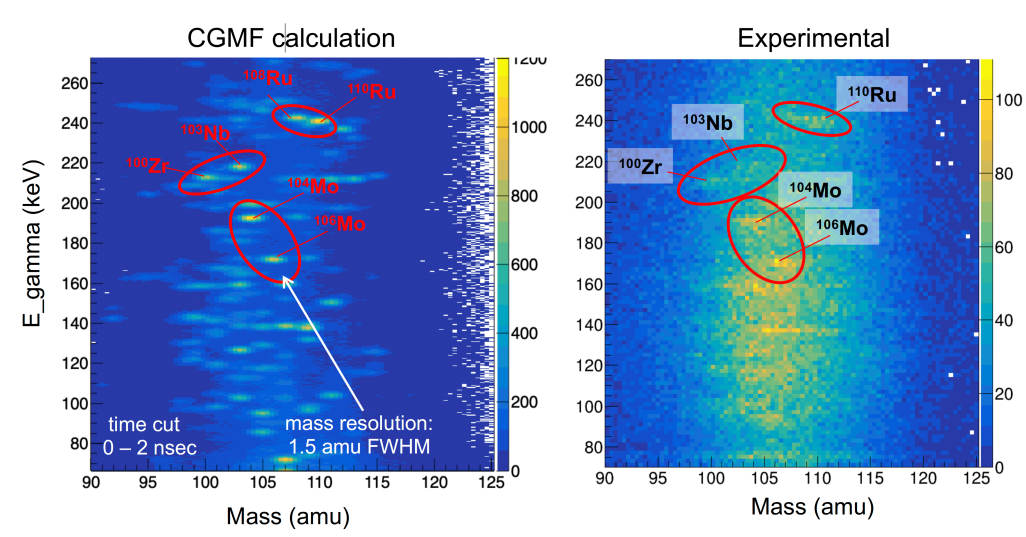
- Gamma-ray tagging with hpGe
- Potentially calibration and resolution

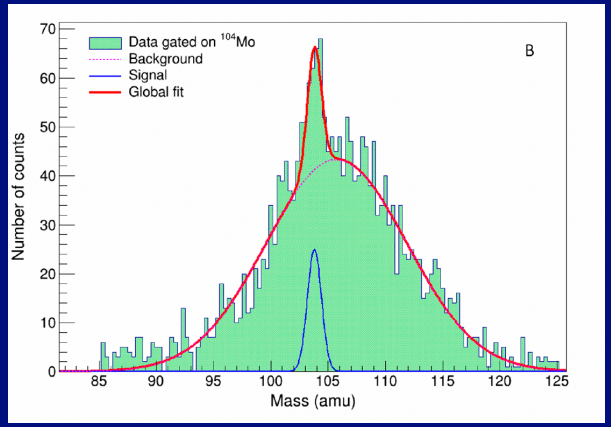


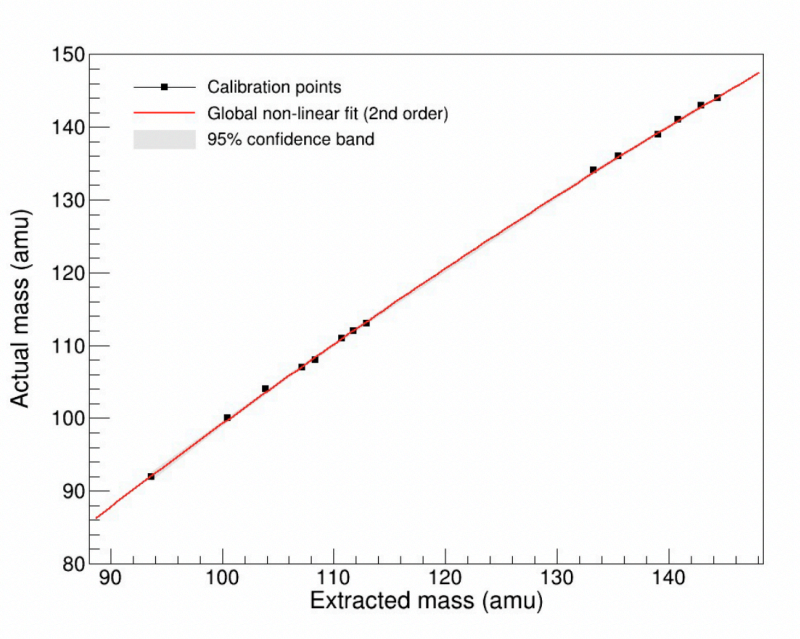
# SPIDER - Calibration Issues

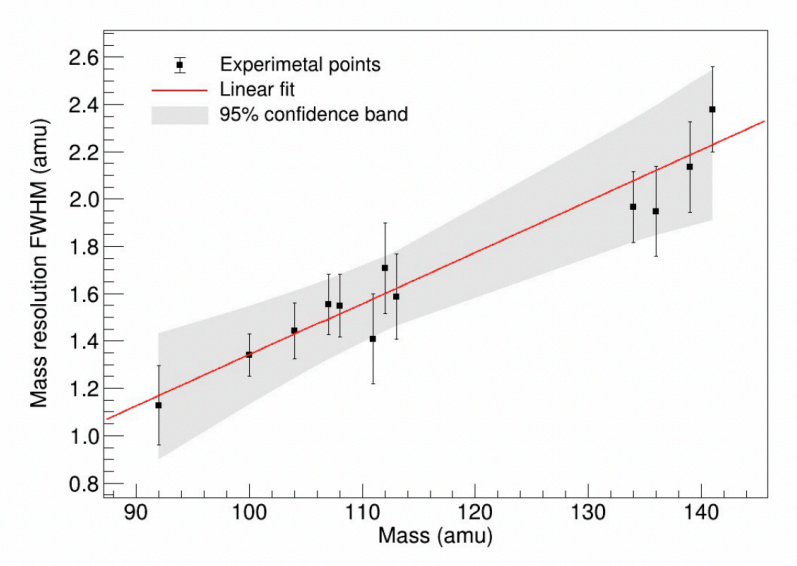
- Unknown calibration, energy loss, and PHD
- Gamma-ray tagging with hpGe
- Resolution with Si DSSD ~1.4 FWHM



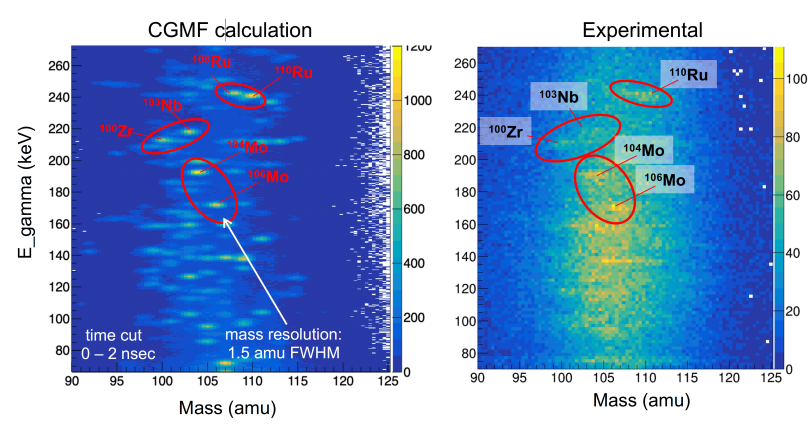
# SPIDER - Calibration and Resolution(!)

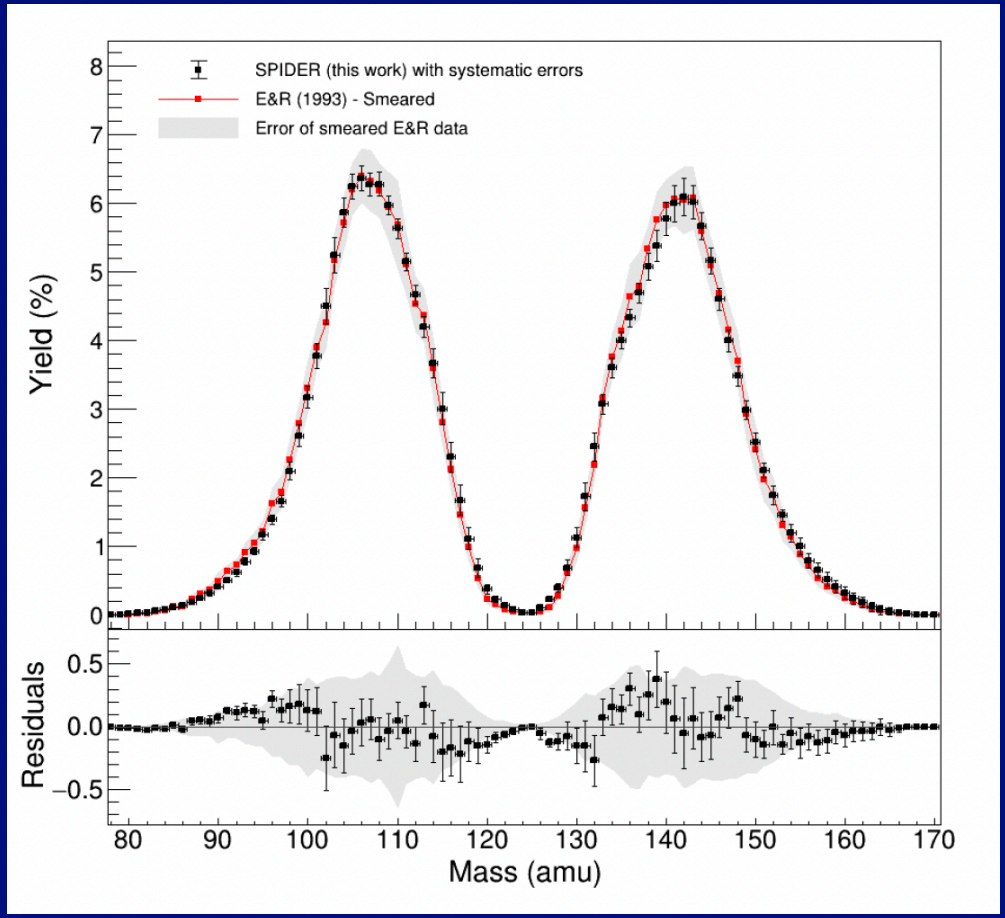


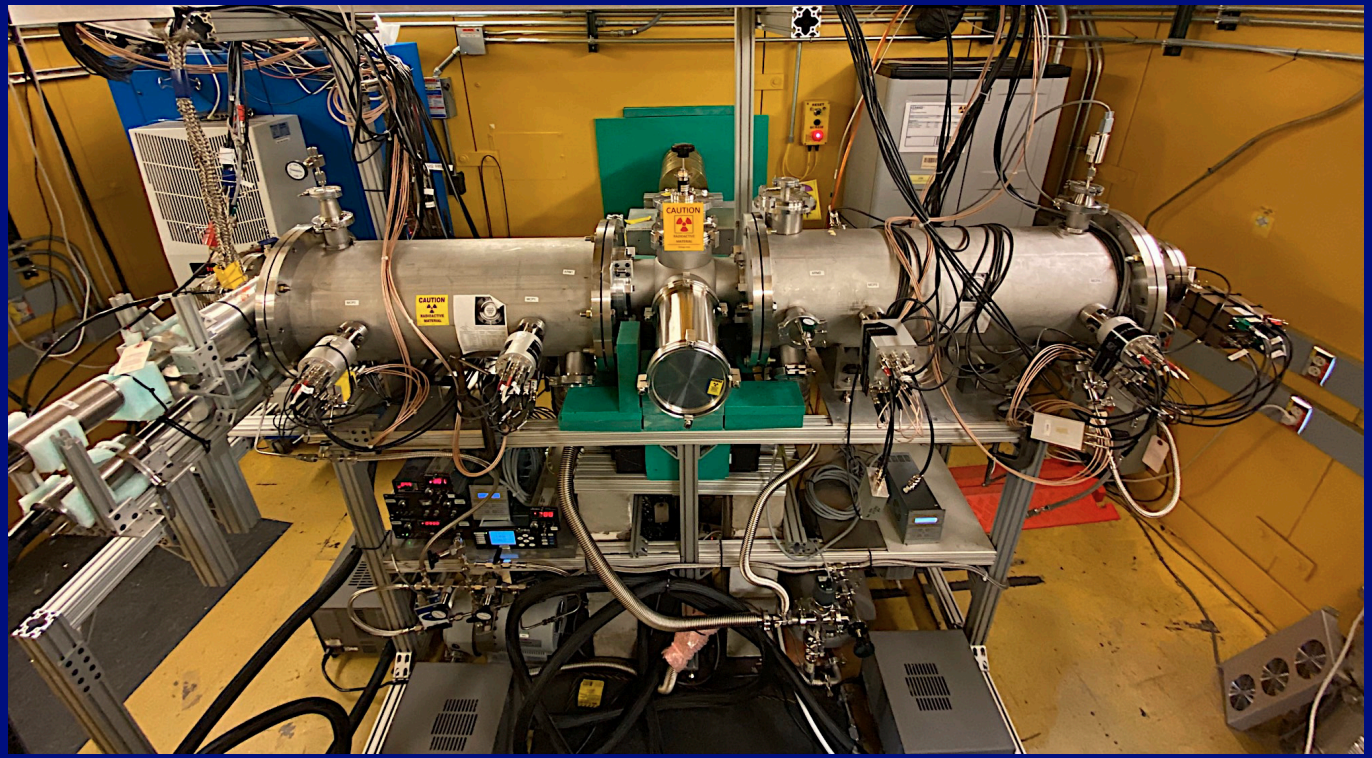
# SPIDER - Progress

- Calibration informs systematic error in FPY's
- Resolution informs covariance
- Gamma spectra with calibrated mass, 252Cf(sf)



# SPIDER - Progress at Lujan Center



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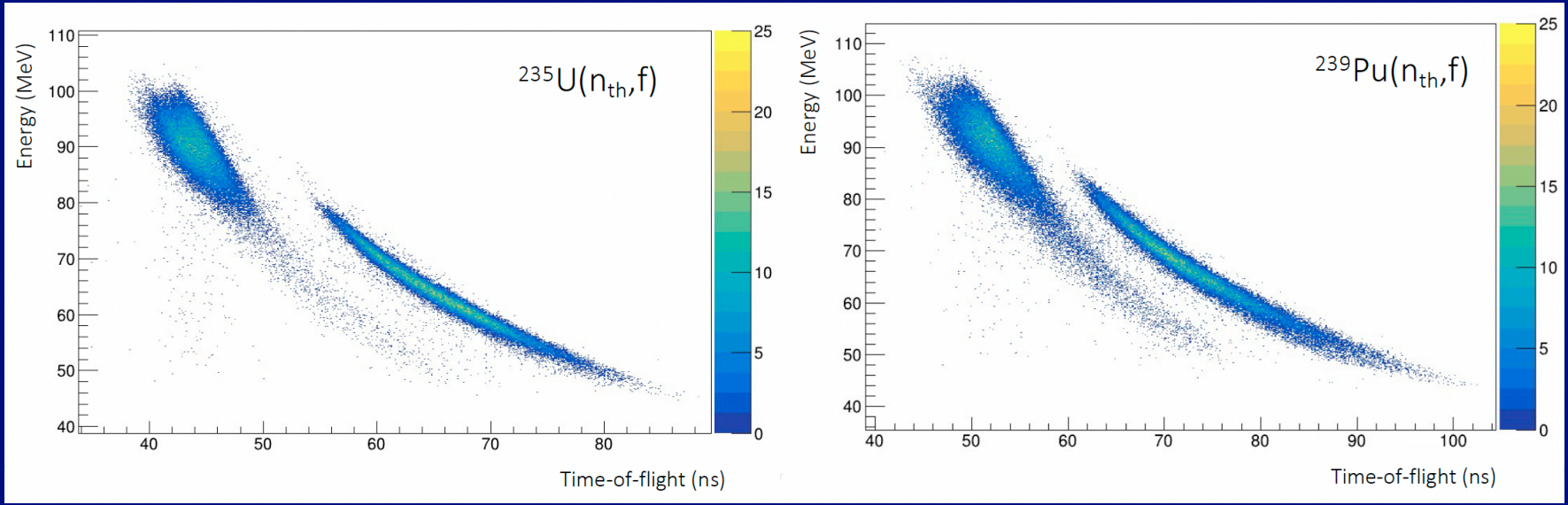

# Future - MegaSPIDER

- Scalability: Need 16 arms
- IFPY's up to 20 MeV at WNR
- Measurement per beam year
- Analyzing IC vs. Si DSSD design choice

# SPIDER People

- Current SPIDER team: J. Winkelbauer (PI), S. Mosby (PL), P. Gastis (PD), C. Prokop (S), S. Kuvin (S)