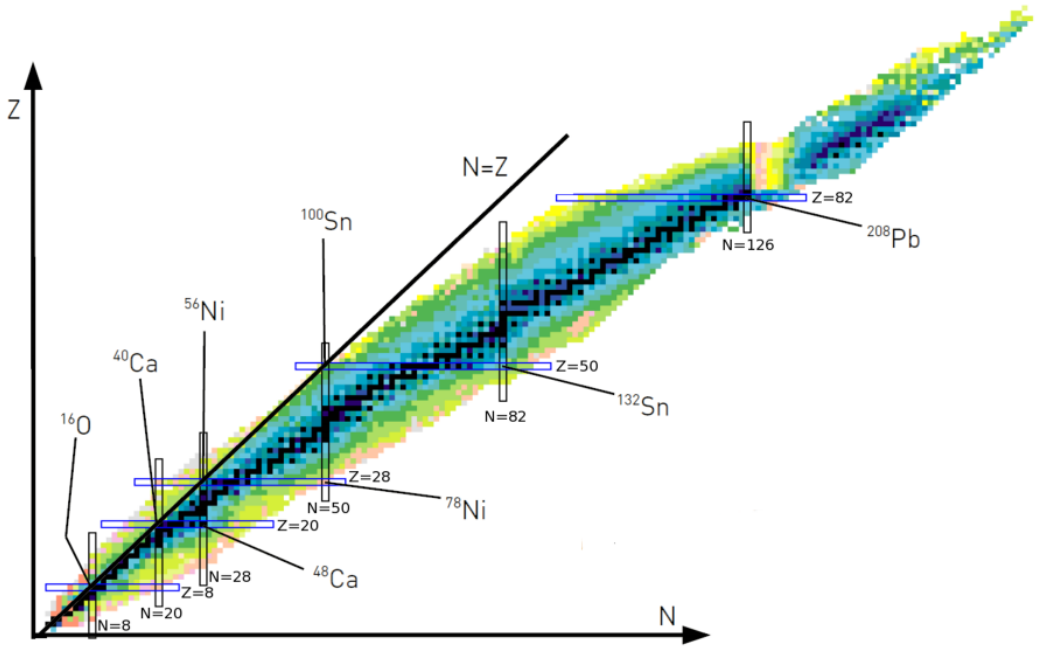
Exploring Mirror Asymmetry with ^{55}Ni and ^{55}Co.

Tyson Schilbach

Department of Physics, Simon Fraser University

Motivation


Z
N
N=Z
^{100}Sn
^{56}Ni
^{40}Ca
^{16}O
^{48}Ca
^{78}Ni
^{132}Sn
^{208}Pb
Z=82
N=126
Z=50
N=82
Z=28
N=50
Z=20
N=28
Z=8
N=20
N=8

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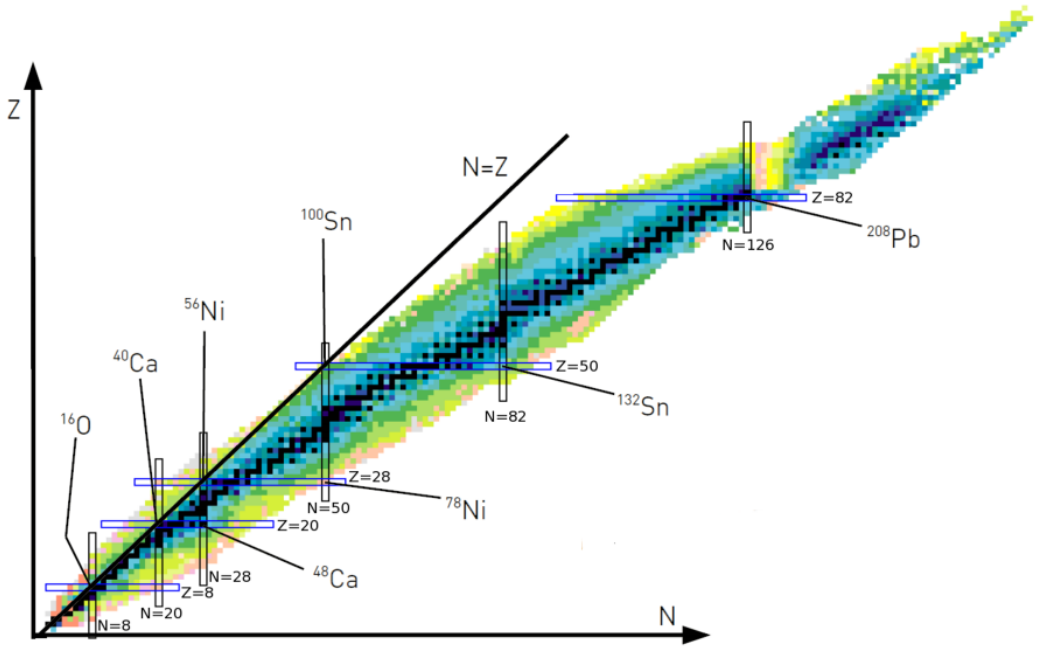

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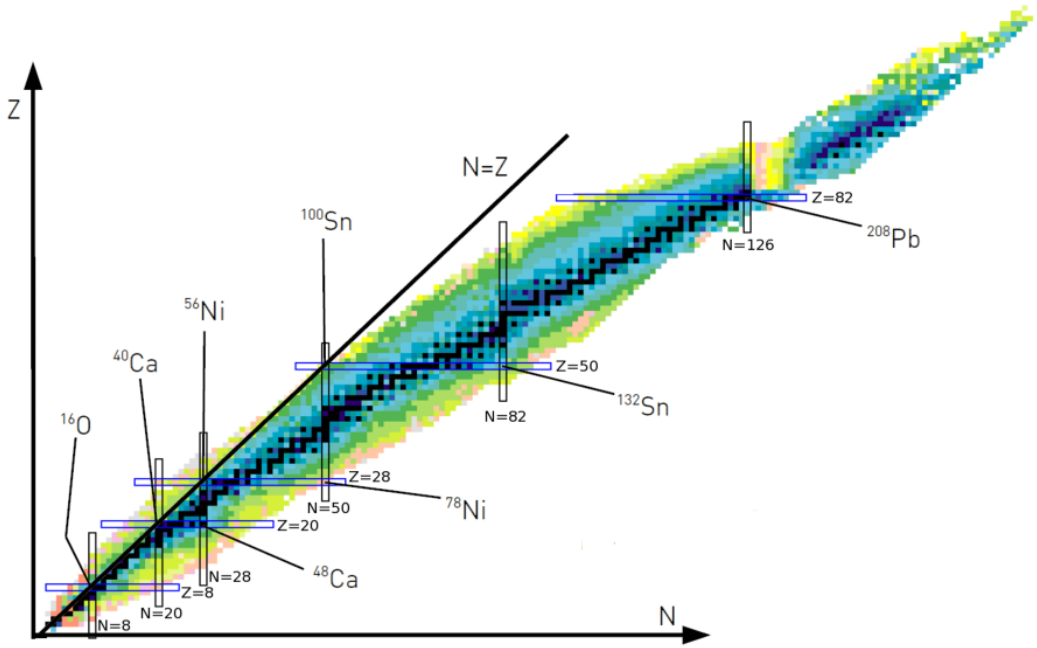

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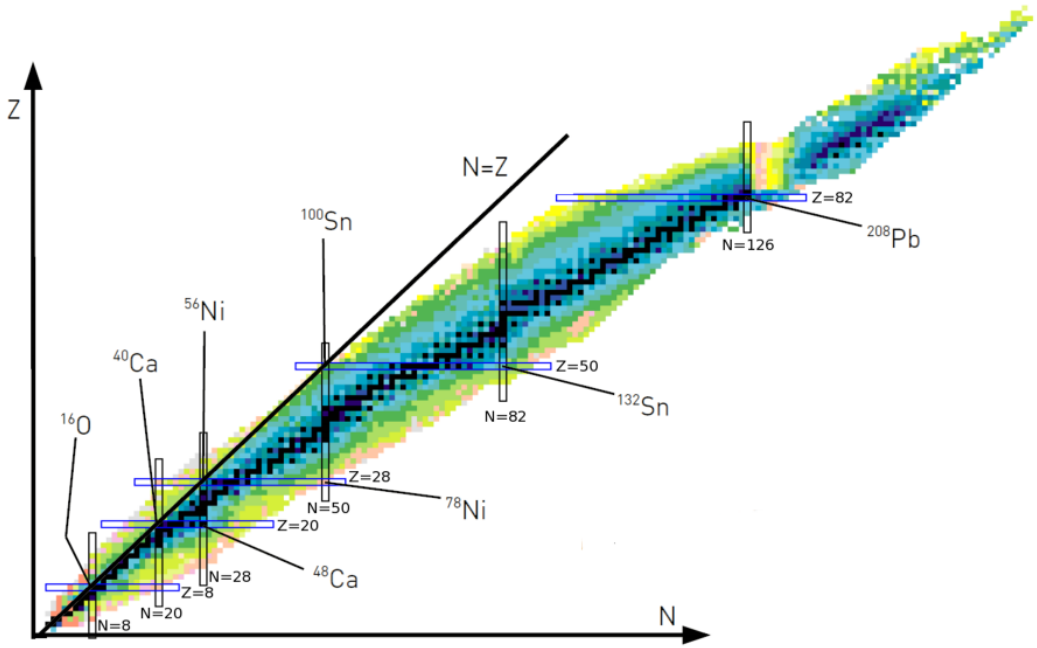

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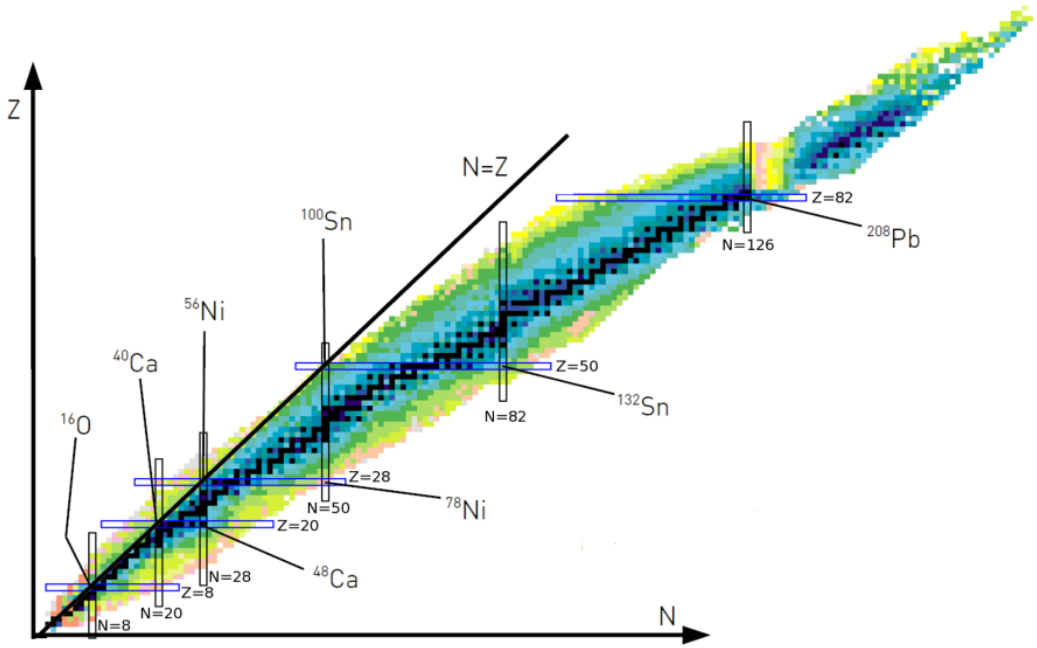

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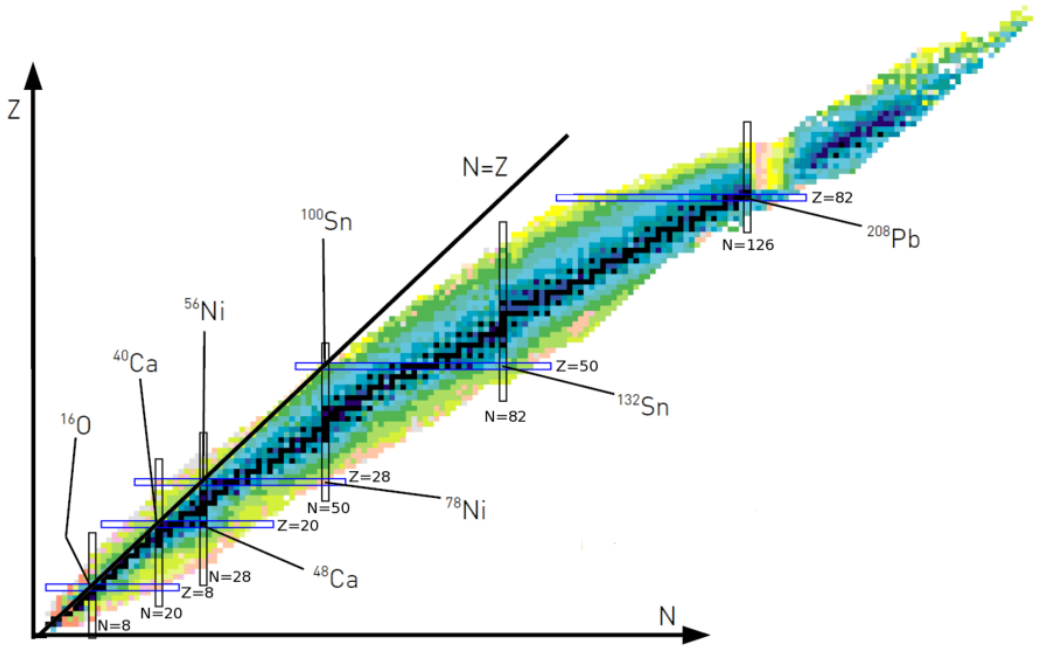

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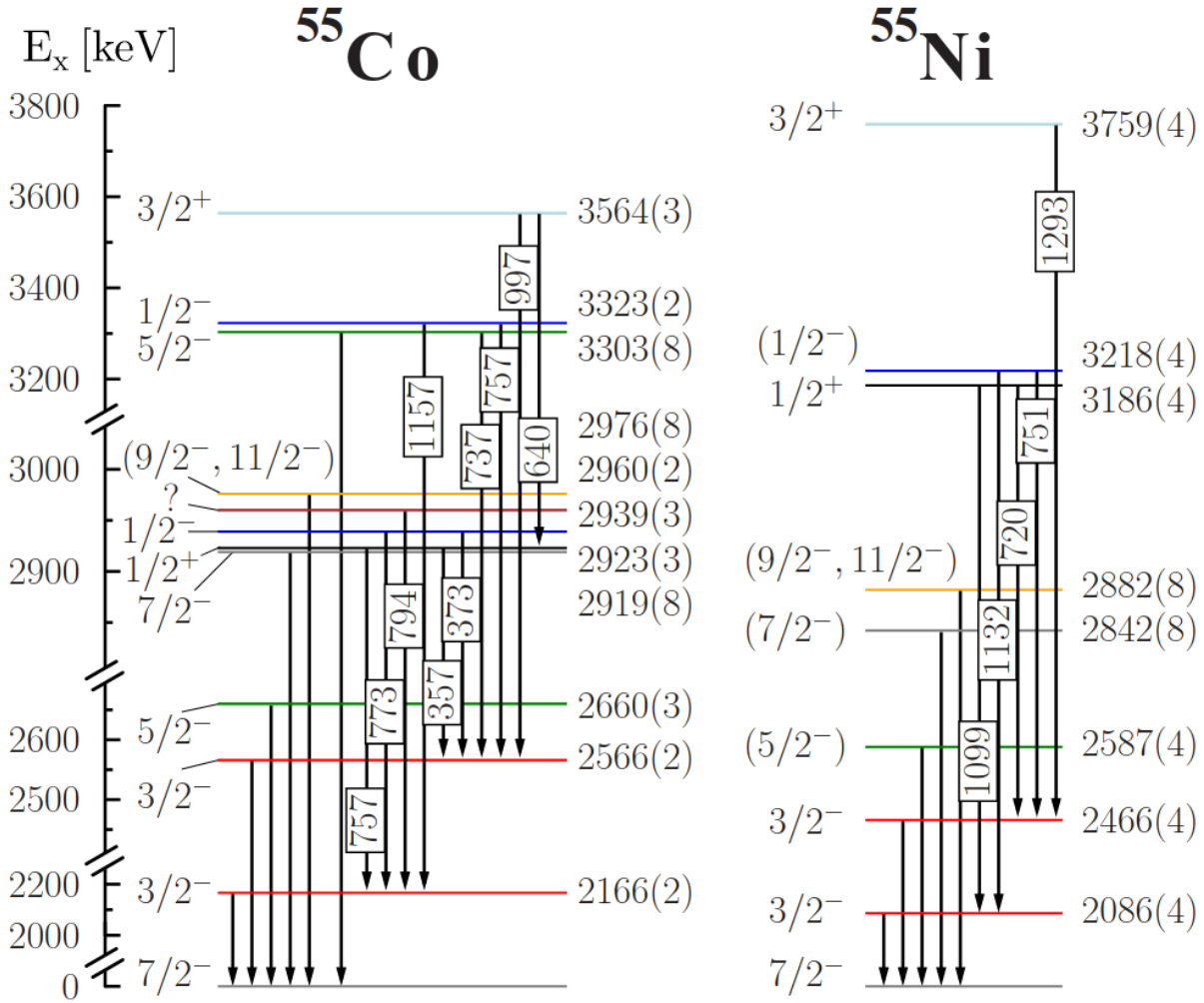
  - Isospin-nonconserving interactions break this mirror symmetry.

Mirror Asymmetry



Spieker et al., Physical Review C, 2019

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- DSAM techniques will be applied in tandem with TIGRESS, TIP and the CsI Ball.

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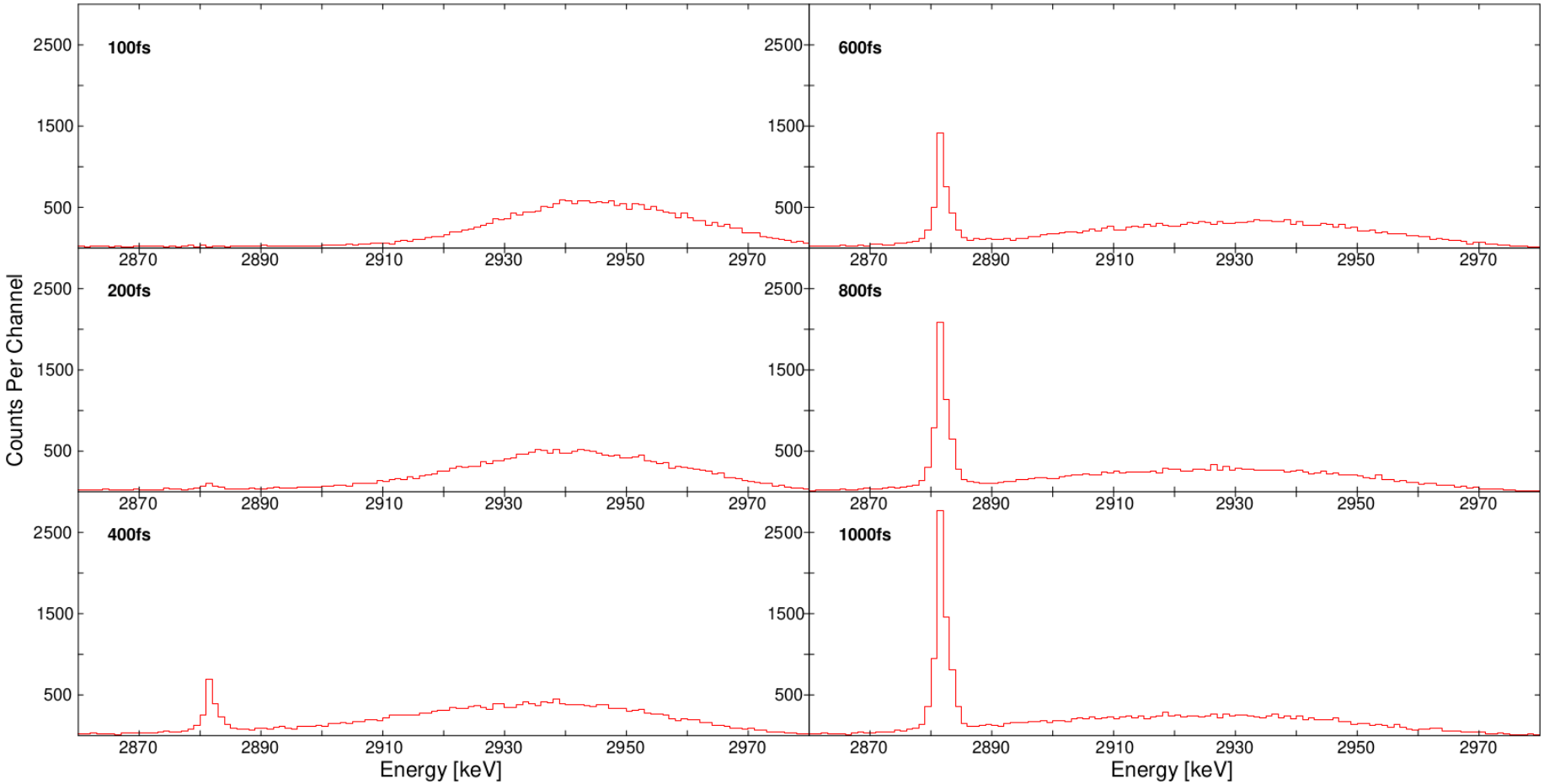
  - Simulation ran for 10^7 reactions

Line Shapes for Varying Lifetimes



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- Estimates are constructed by comparing GEANT4-simulated data to experimental data.

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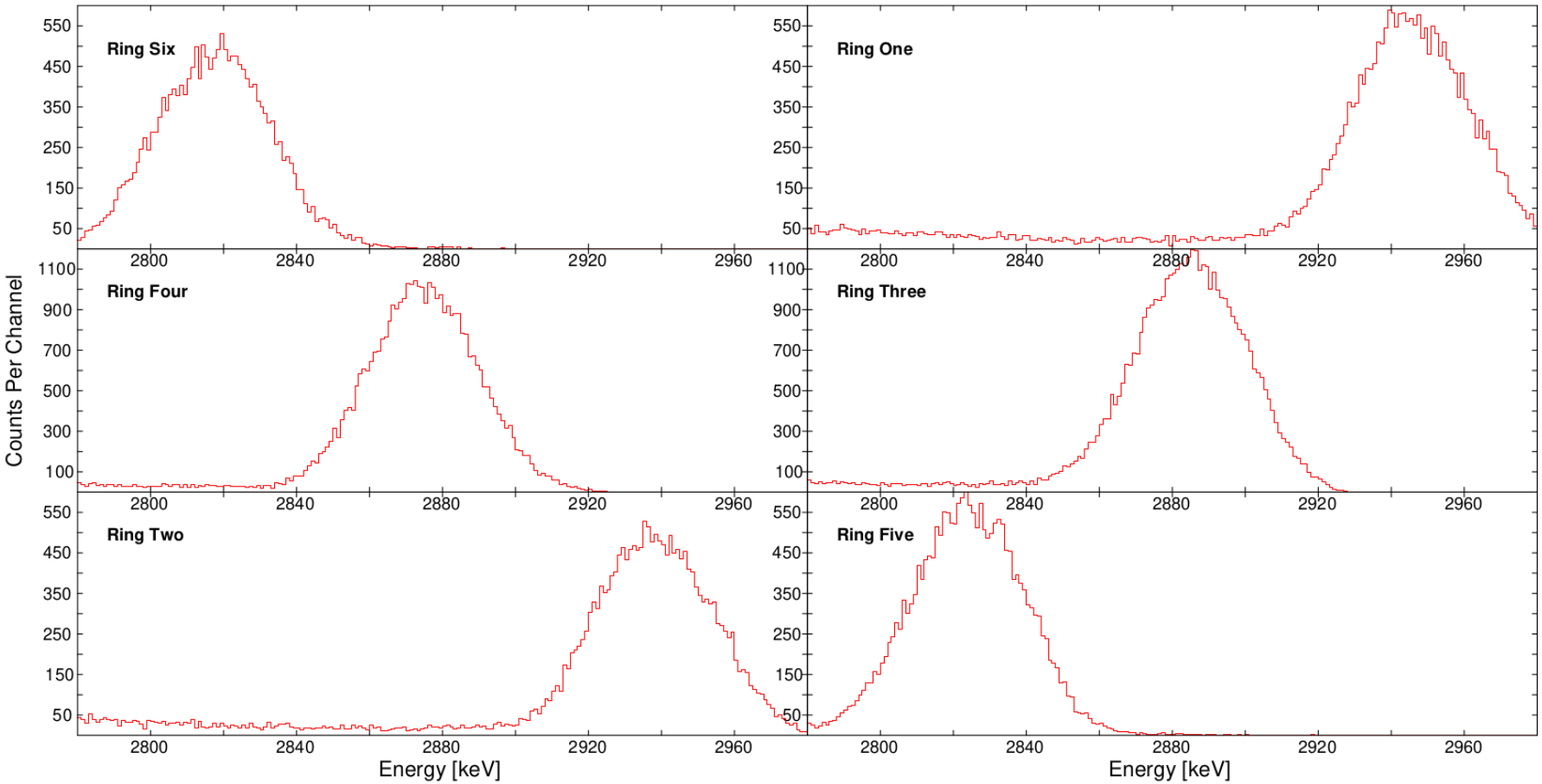
- Likelihood function maximized by $\hat{\lambda}_i = n_i$ for $\lambda_i, n_i > 0$

Centroid Change with Ring Number



$$E_d = E_o \frac{\sqrt{1-\beta^2}}{1-\beta\cos\theta} \tag{5}$$

Centroid Analysis

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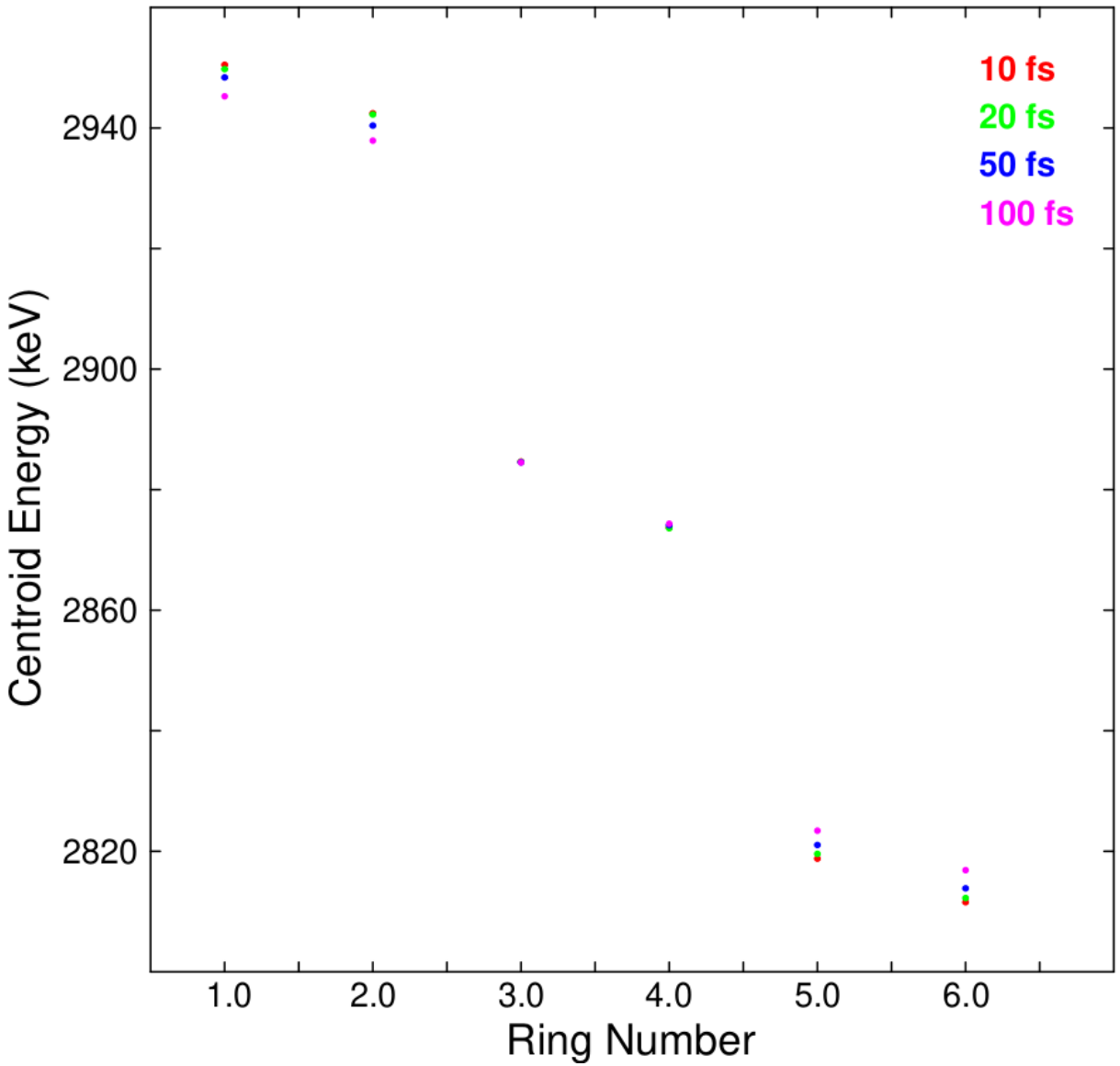
$$C_{err} = \frac{\sigma}{\sqrt{N}} \tag{8}$$

Centroid Comparisons



Acknowledgements

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- K. Starosta[1]
- M. Martin[2], A. Redey[3], A. Woinoski[2], F. Wu[1]
- G. Hackman[4], K. van Wieren[5], J. Williams[4]

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