Angular distribution of prompt fission γ-rays

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Senior Researcher, FLNP JINR, PhD, Berikov Daniyar

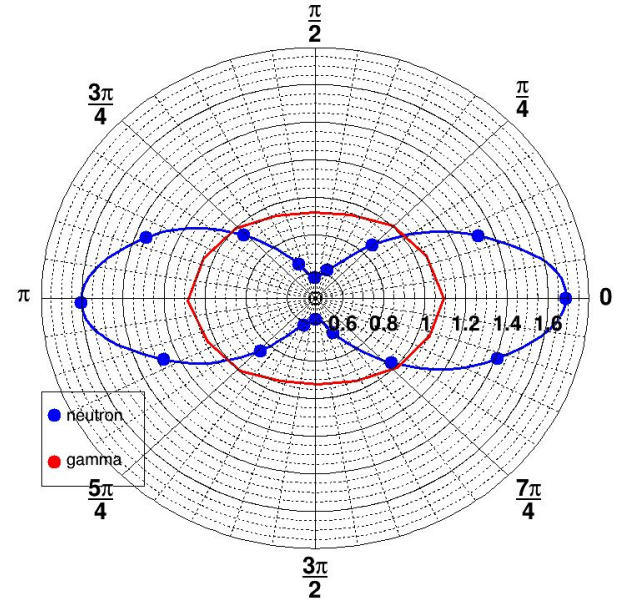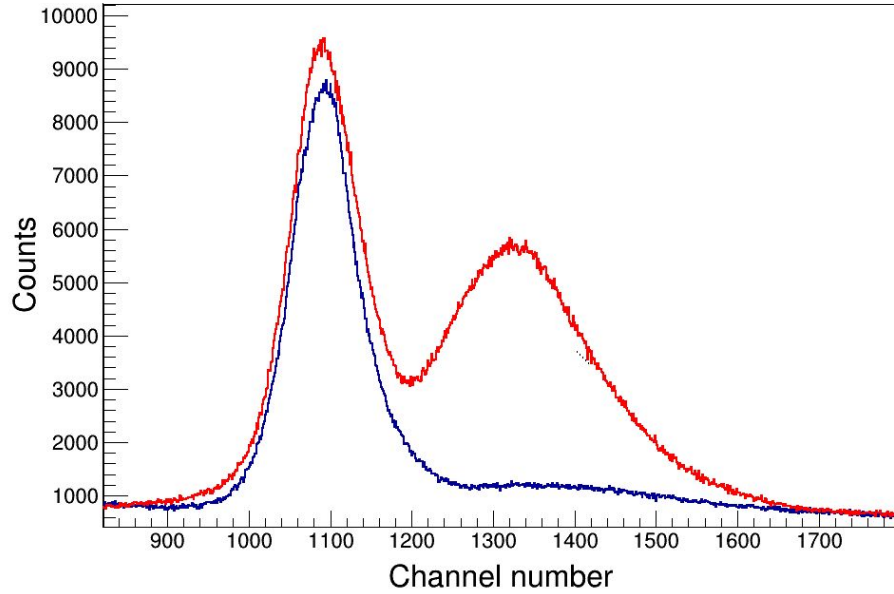# Angular distribution of prompt fission γ-rays

[1] M. V. Blinov et al., Soviet Phys. JETP **16** (1963) 1159

[2] S. S. Kapoor and R. Ramanna, Phys. Rev. **133** (1964) B598

[3] M. Hoffman, Phys.Rev, **133**, B714 (1964)

[4] G. A. Petrov, Soviet Phys. JETP **20** (1965) 1387

[5] K. Skarsvàg, Nucl. Phys. A **96** (1967) 385.

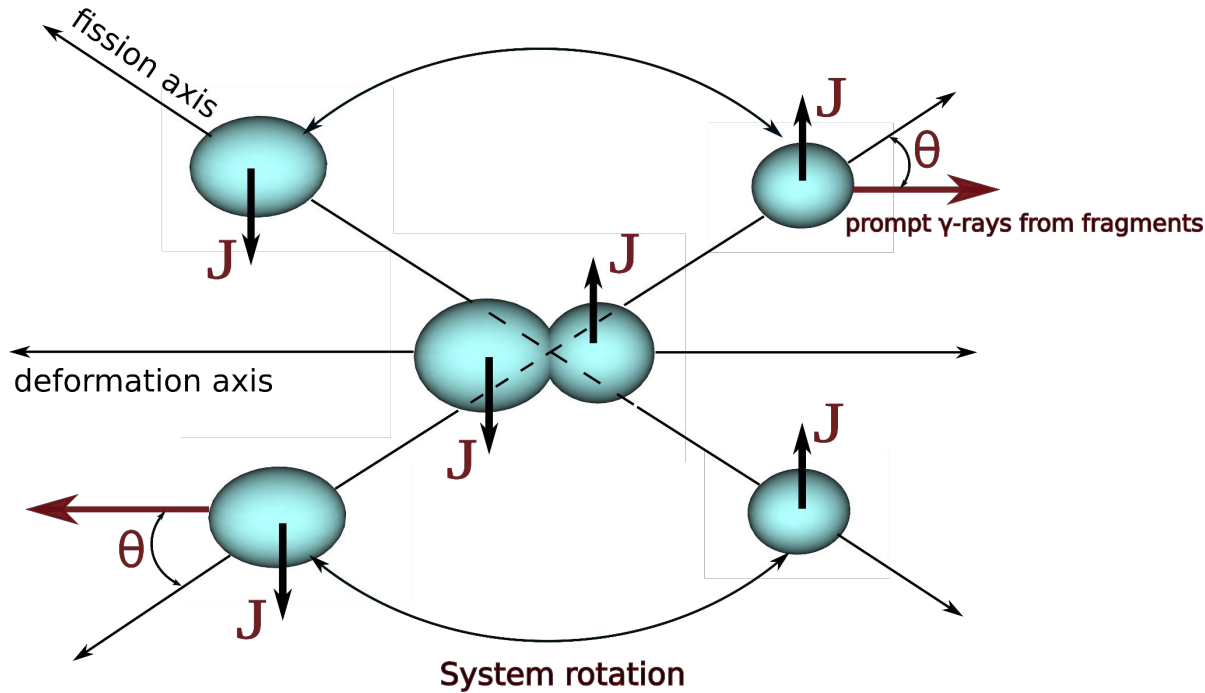[6] G.V. Valsky, A.M. Gagarski et al., Bull. Russ. Acad. Sci. Phys. **74** (2010) 767

$$A = (W(0°) - W(90°))/W(0°)$$

For the fission of ^{235}U the value of A is in the range of 12-16 %

Anisotropy coefficient A

ROT-effect

fission axis

J

θ

prompt γ-rays from fragments

J

J
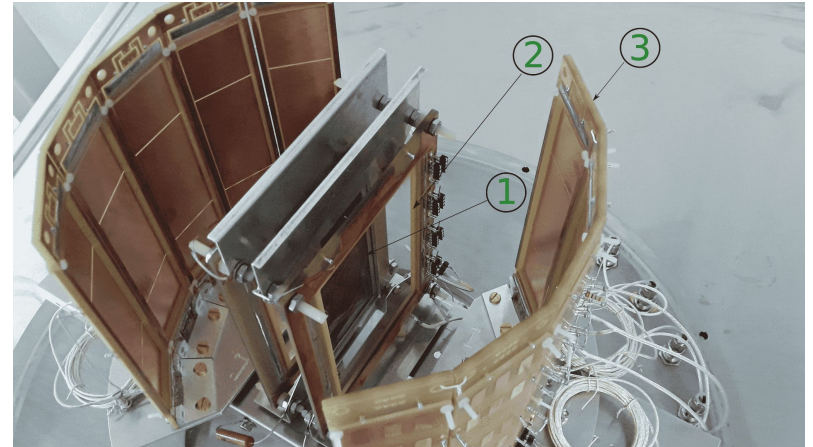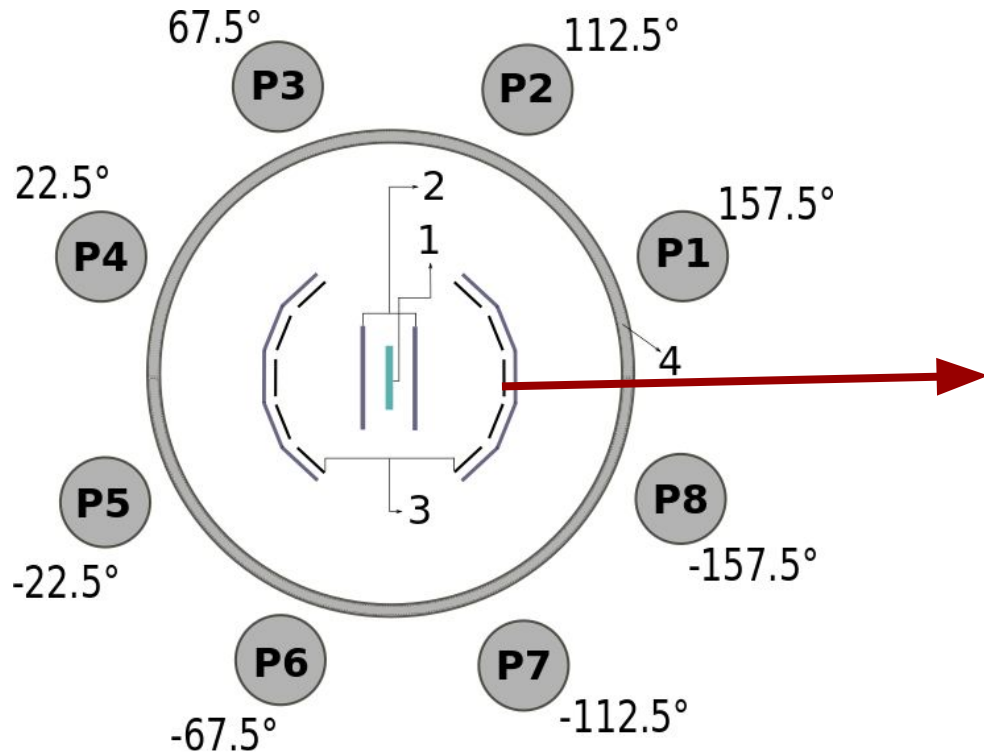
deformation axis

J

J
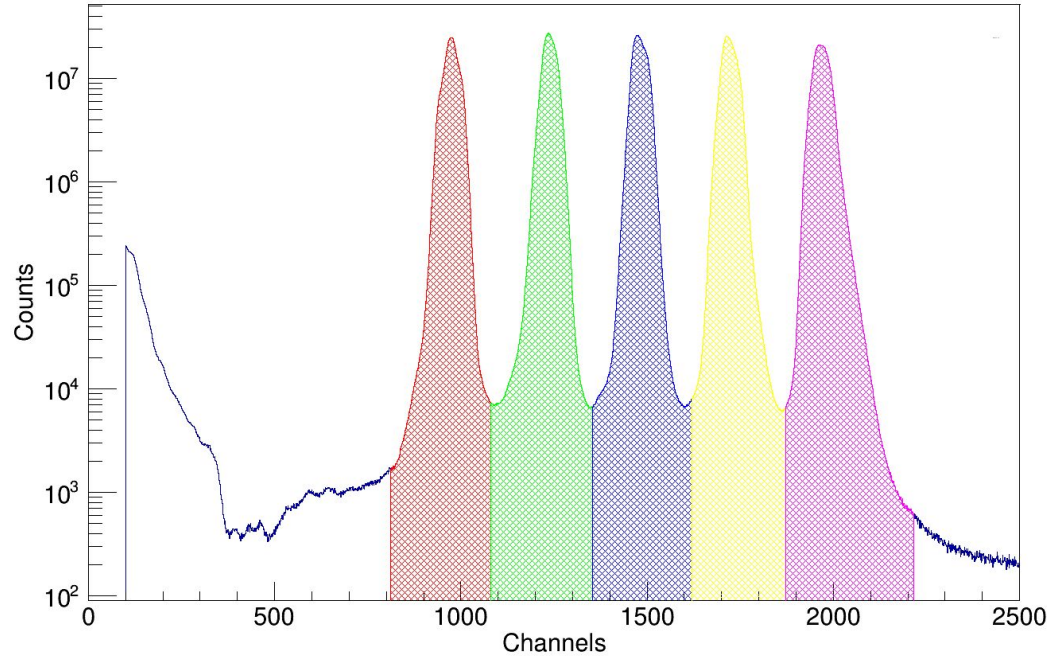
θ

J

System rotation

$$D(\theta) = \frac{\delta \cdot W^{'}(\theta)}{W(\theta)}$$

D. Berikov, G. Ahmadov, Yu. Kopatch, A. Gagarski et al., Phys. Rev. C **104** (2021) 024607
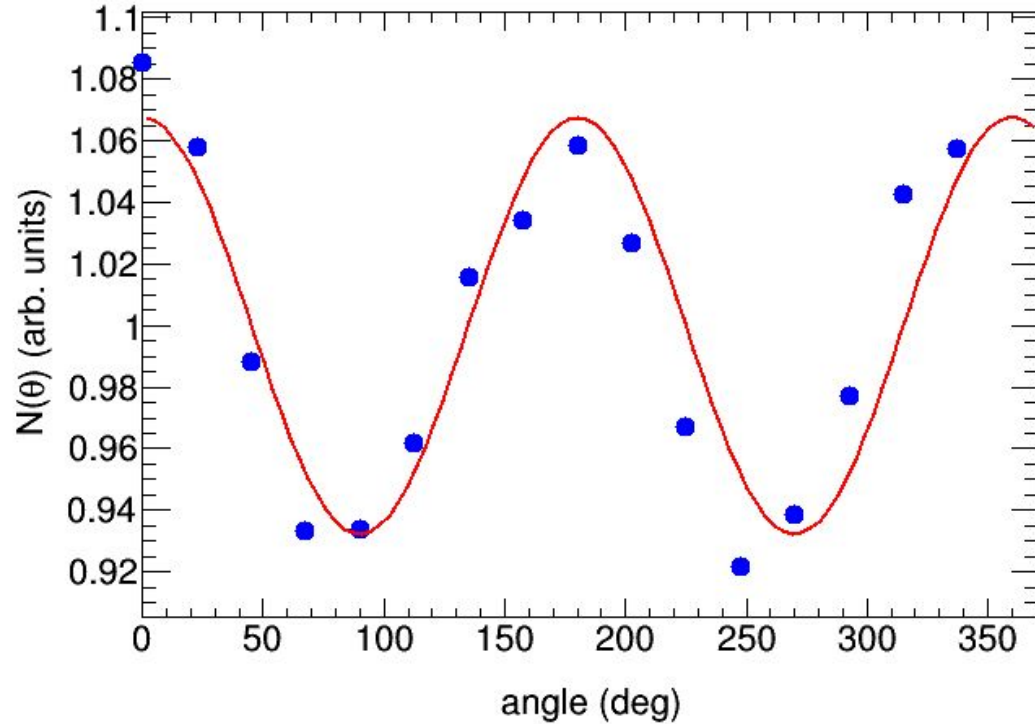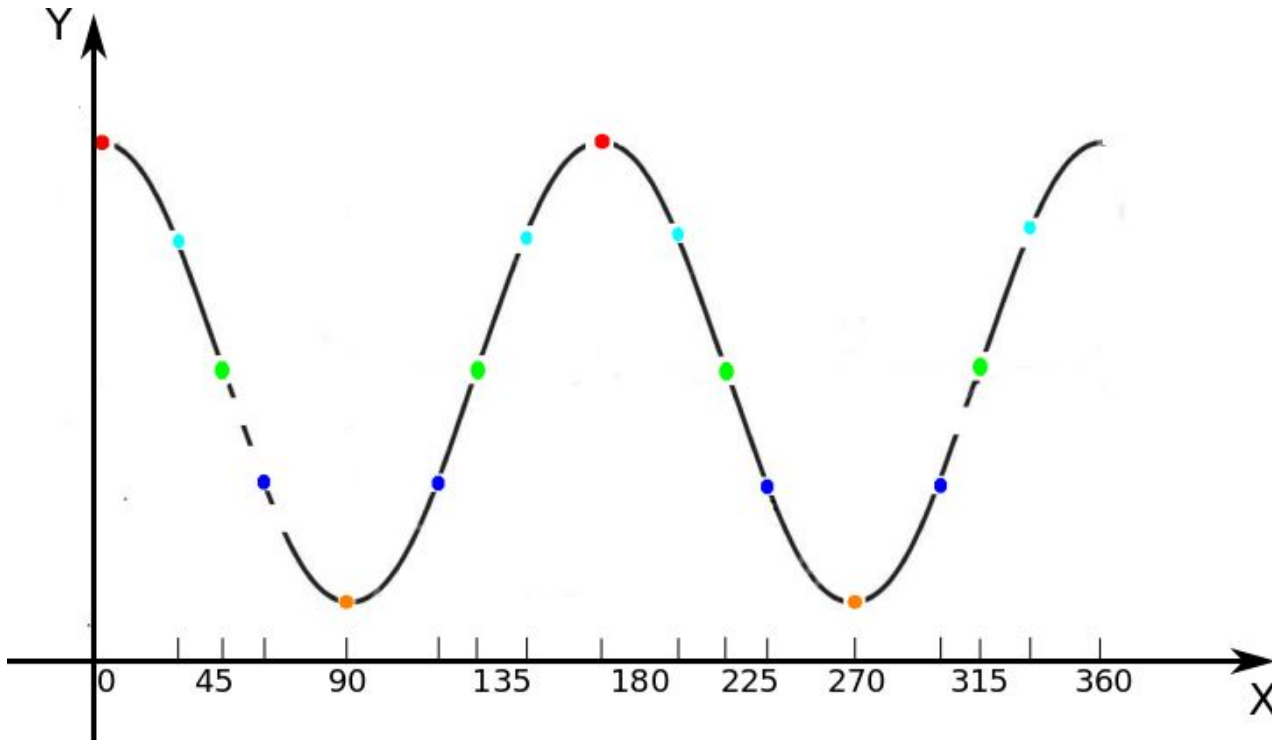
Experimental setup

Time-of-flight spectrum of one of the stop detectors

Results

$$N(\theta) \sim 1 + A \cdot \cos^2\theta$$

Coefficient definitions
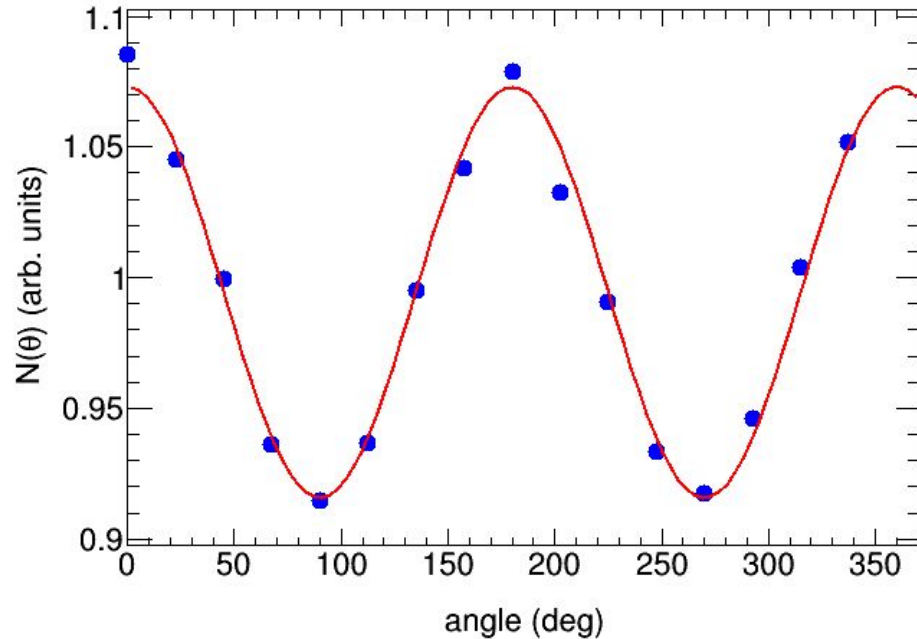

$$\theta = Pl_{ang} - FF_{ang}$$

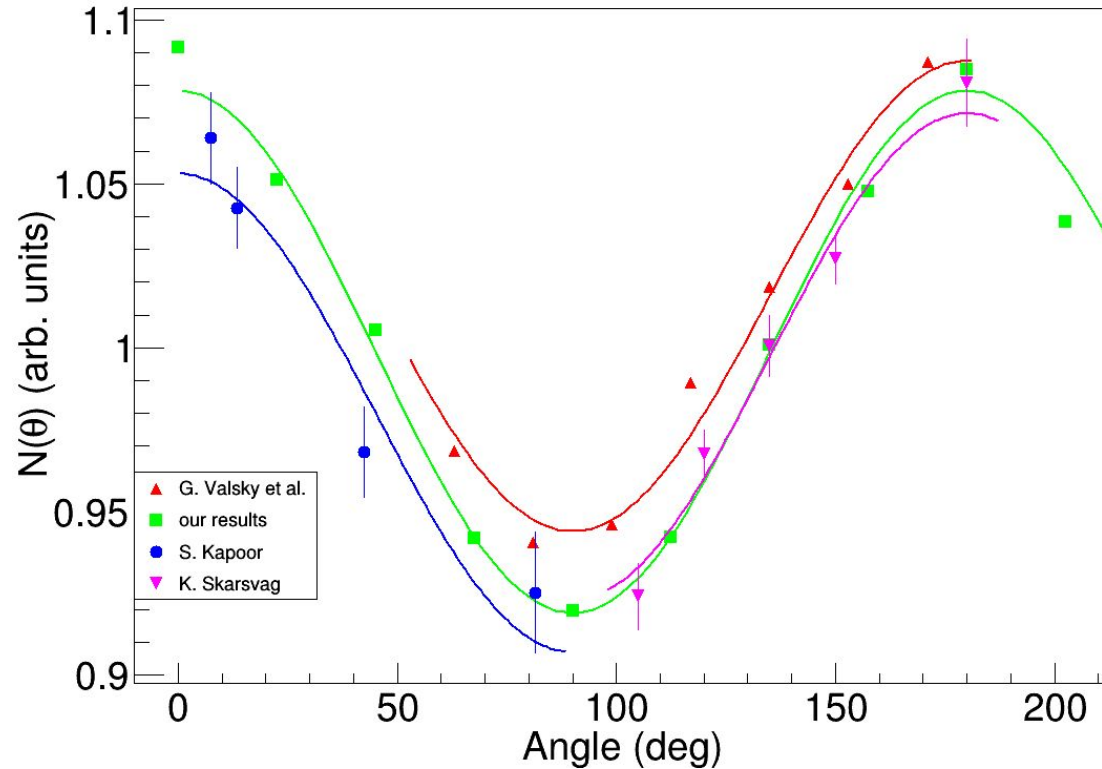D. Berikov, G. Ahmadov et al., Eurasian J. Phys. Funct. Mater. 4, 114 (2020).

Angular distribution of prompt gamma-rays in binary fission ^{235}U

$$A = 0.1570 \pm 0.0053$$

G. Ahmadov, D. Berikov, Yu. Kopatch, Rom. Rep. Phys. **75** (2023) 202

Comparison of results

Conclusion

- The angular distribution of prompt γ-rays from the fission of ^{235}U was measured using a beam of monochromatic neutrons with an energy of 60 meV
- The resulting angular distribution was corrected for the thresholds of the detectors. The coefficients associated with the threshold of each detector were found by analyzing data from all possible combinations of stop and gamma detectors separately.
- The value of the anisotropy was found A = 0.1570 ± 0.0053.
- It is shown that the obtained values of the anisotropy A will be used to study the ROT-effect.

Thank you!