Observation of Fission Isomers among Fragments of Spontaneous and Induced Fission of Heavy Nuclei

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In three different experimental approaches, it was consistently found that part of the fission fragments from the reactions $^{235, 238}$U(γ, f), ^{232}Th(γ, f), ^{235}U(n_{th}, f) and ^{252}Cf(sf) are presumably born in the state of the fission isomer (with yield Y ≈ 10^{-3}/binary fiss.) with lifetime τ_{isom} > 400 nsec. A binary break-up of such fragments was observed when passing through foils made of Ti, Cu, Ni, Al_2O_3 due to inelastic Coulomb scattering on the foil nuclei. At least one of the three resultant products of the splitting of the mother nucleus in this channel is a magic or near-magic nucleus. The effect was observed for the first time.

References

1. D.V. Kamanin et al., Bulletin of the Russian Academy of Sciences: Physics, V. 87 (2023), p. 1238.
2. D.V. Kamanin et al., Journal of Physics: Conference Series, V. 2586 (2023) 012043.