

K-isomerism in seaborgium

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Excited states with high K quantum numbers provide valuable information on the underlying nuclear structure. Due to the conservation of the K quantum number in deformed nuclei, transitions requiring large changes in K are strongly hindered, and thus those excited states exist as isomers [1,2]. Of special interest are superheavy nuclei, where the high- K states are significantly stable against fission [3,4]. This enables access to nuclei whose ground states would otherwise be too short-lived to be experimentally studied [5].

K isomers are spread over in nobelium ($Z=102$) and rutherfordium ($Z=104$) isotopes, however, in the heavier elements, only two alpha-decaying cases have been observed [²⁷⁰Ds ($Z=110$) and ²⁶⁶Hs ($Z=108$)] [2]. Only recently, at TASCA, a strong indication of a K -isomeric state was observed in seaborgium ($Z=106$) isotopes, i.e., in ²⁵⁹Sg [6].

Inspired by this observation [6], all experimental data on seaborgium isotopes accumulated at SHIP during 2003-2009 were revisited. In this talk we will present the results from the reanalysis of those experimental data.

References

- [1] P. Walker and G. Dracoulis, *Nature* 399, 35 (1999).
- [2] D. Ackermann, S. Antalic and F. P. Heřberger, *Eur. Phys. J. Spec. Top.* 233, 1017 (2024).
- [3] F. R. Xu et al., *Phys. Rev. Lett.* 92, 252501 (2004).
- [4] J. Khuyagbaatar, *Eur. Phys. J. A* 58, 243 (2022).
- [5] J. Khuyagbaatar, P. Mosat, et al., *Phys. Rev. Lett.* 134, 022501 (2025).
- [6] P. Mosat, J. Khuyagbaatar, et al., *Phys. Rev. Lett.* 134, 232501 (2025).

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