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Studies of shape coexistence in 140Sm

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The shape of atomic nuclei can vary vastly, several shapes can even coexist within the same nucleus in certain regions of the nuclear chart. Shape coexistence is believed to be present at higher excitation energies in the N=78 isotones 140Sm and 142Gd [1], where the nucleus of interest is 140Sm in this case. 140Sm has previously been studied in a coulomb excitation experiment performed by M. Klintefjord et. al. [2] at REX-ISOLDE where results showed considerable gamma-softness and the resulting level scheme follows the theoretical prediction of a triaxial nucleus [3], but further investigation is needed to conclude. A new coulomb experiment on 140Sm has been performed using HIE-ISOLDE, yielding data of incredible quality which has also let us vastly improve the level scheme of this nucleus. Preliminary results from this dataset will be presented as well as a deeper look into gamma-softness as well as the possibility of 140Sm having shape coexistence.

[1] W. Starzecki et al., Phys. Lett. B 200, 419 (1988).
[2] M. Klintefjord et al. Phys. Rev. C 93, 054303 (2016)
[3] F. Iachello, Phys. Rev. Lett. 85, 3580 (2000)

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