Studies of Heavy Pear-Shaped Nuclei at ISOLDE

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For certain combinations of protons and neutrons it is expected that the shape of atomic nuclei can undergo octupole deformation, which would give rise to reflection asymmetry or a "pear shape". In this talk I will describe how recent experiments using REX-ISOLDE[1] and HIE-ISOLDE[2,3,4], CERN have provided evidence that several radium and radon isotopes have either stable pear shapes or are octupole vibrational in nature. I will show that our data on transition moments in particular present challenges for theory. I will briefly talk about the relevance of our measurements for atomic EDM searches, and discuss the future prospects for this field.

1. LP Gaffney et al., Nature 497 (2013) 199

2. PA Butler at al., Phys. Rev. Lett. 124 (2020) 042503

3. PA Butler et al., Nat. Comm. 10 (2019) 2473, Nat. Comm. 11 (2020) 3560

4. P. Spagnoletti et al., paper in preparation