Spectroscopy of pear-shaped nuclei

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It is well established that nuclei with certain numbers of neutrons and protons are susceptible to octupole correlations which can lead to reflection-asymmetric pear-shapes. The extent of the pear shape depends on the strength of the octupole correlations; some nuclei are octupole vibrational, possessing an oscillating transient pear shape, but others are octupole deformed, having a permanent pear-shaped deformation in the ground state. The strongest octupole correlations occur in the light-actinide region with near 224Ra (Z=88, N=136). Strong octupole correlations also occur in the neutron-rich lanthanides near 144Ba (Z=56, N=88), and there are expectations of strong octupole correlations in the very neutron-deficient nuclei near 112Ba (N=56, Z=56). Pear-shaped nuclei have characteristic spectroscopic features such as interleaving sequences of states with opposite parities and enhanced E1 transitions. In this presentation, the experimental evidence for octupole correlations will be reviewed and summarized, and some recent results will be presented. The presentation will also give some prospects for future experimental studies of pear-shaped nuclei.