# Nuclear charge radii and E0 transitions in the interacting boson model

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A systematic study of energy spectra throughout the rare-earth region (even-even nuclei from $^{58}$Ce to $^{74}$W) is carried out in the framework of the interacting boson model (IBM), leading to an accurate description of the spherical-to-deformed shape transition in the different isotopic chains. The resulting IBM Hamiltonians are then used for the calculation of nuclear charge radii (including isotope and isomer shifts) and E0 transitions with consistent operators for the two observables. The main conclusion of this study is that an IBM description of charge radii and E0 transitions is possible for most of the nuclei considered but that it breaks down in the tungsten isotopes. It is suggested that this failure is related to hexadecapole deformation.