

Presentation of Master Thesis

Nuclear radii for excited states

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Abstract

In this thesis the charge radius and the neutron radius for the ground state and the well-known 16^+ isomeric state of ^{178}Hf are investigated. In an experiment published 12 years ago the charge radius of this isomeric state was measured to be slightly smaller than for the ground state. Different effects which influence the radii are investigated in this thesis. The Nilsson model is used to calculate single-particle energies and radii. The BCS-theory is then used to treat the pairing interactions in the ground state. The deformation of the nucleus in the two states is also discussed. Another effect on the radius comes from the collective motion of the nucleus around its equilibrium deformation according to Heisenberg's uncertainty principle is discussed. The charge radius for the excited state is found to have a slightly smaller charge radius than the ground. Compared to the experimental value the result has the correct sign but the absolute value is smaller.

Welcome!