

Ab initio calculation of the calorimetric electron capture spectrum of ^{163}Ho

The determination of the electron neutrino mass by electron capture (EC) in ^{163}Ho relies on a precise understanding of the deexcitation of a core hole after an EC event. Our ab initio calculation of the EC spectrum of ^{163}Ho includes all intra-atomic decay channels and many-body interactions on a basis of relativistic bound-orbitals. Many-body Coulomb interactions result in the formation of multiplets and additional peaks corresponding to multiple core-holes created via Auger decay. Multiplets change the appearance of the resonances on a Rydberg energy scale. These additional structures do not directly influence the statistics for determining the neutrino mass, as the spectral end-point is affected mostly by the mass itself. The multiplet broadening and Auger shake-up of the main core-level edges do change the apparent line-width and accompanying lifetime of these edges. Fitting core level edges by a single resonance thus leads to an underestimation of the core hole lifetime.

Session and Location

Monday Session, Poster Wall #10 (Robert-Schumann-Room)

Poster included in proceedings:

yes

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Track Classification: Poster (not participating in poster prize competition)