Single particle properties of Λ hypernuclei in the density dependent hadron field theory

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The Density Dependent Relativistic Hadron Field Theory (DDRH) is used to describe single particle properties of Λ hypernuclei. Results for the Λ spin-orbit splitting and transition rates for Auger neutron emission in the decay of heavy hypernuclei are presented.

New KEK-SPS hypernuclear data suggest a considerably larger spin-orbit splitting in heavy hypernuclei than is concluded from measurements in the light mass region. Theoretical predictions of the DDRH calculations are in good agreement with these new measurements. Within our approach the reduced spin-orbit interaction strength in light hypernuclei is also reproduced. It is found to be caused by a continuum threshold effect typical for weakly bound systems, diluting the extraction of generic spin-orbit information especially in light p-shell nuclei.

For heavy single Λ hypernuclei calculations of transition rates for the de-excitation of Λ states through the emission of Auger neutrons are presented. The importance of this effect had already been pointed out previously. Auger rates are now calculated in a fully relativistic framework using realistic in-medium interactions, wave functions and energies taken from our DDRH calculations.

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