EVIDENCE FOR DEFORMED STATES IN ^{75}Br

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The excited states in ^{75}Br have been studied via the reactions (p,γ), (d,nγ), (^{3}He,pnγ) and (α,p2nγ) on ^{74}Se targets by using in-beam γ-ray spectroscopy. In addition to measurements of $\gamma\gamma$-coincidences, excitation functions and angular distributions of γ-rays also lifetime measurements in the nanosecond region have been carried out. The results are summarized in the level scheme presented in the figure. Only four of the lowest excited states were known from earlier studies /1,2/. For the ground state the quantum numbers $3/2^-$ were adopted /3/ although this assignment is not completely sure. The B(E2) value of 88 Weisskopf units derived for the 88.4 keV γ-ray indicates strong collectivity within the positive-parity band. In a deformed field these levels can be interpreted as members of a Coriolis perturbed rotational band emanating from the $g_{9/2}$ Nilsson multiplet. Comparing the excitation energies of these unique-parity levels in ^{75}Br and in ^{77}Br one sees a typical lowering of the levels with spin I = j, j+2 etc. in ^{75}Br. Such a behaviour is well known in the spectra of unique-parity bands in transitional Tb nuclei /4/ having quite different deformations. A comparison of the excitation energies in ^{75}Br and ^{77}Br with those in ^{153}Tb and ^{155}Tb reveals that the effective deformation for these states in ^{75}Br is greater than in ^{77}Br. This tendency of increasing deformation with decreasing neutron number was also deduced for the even-mass Kr nuclei /5/. The proposal of a maximum deformation for the neutron number 42 by Behar et al. /2/ was not supported.

Literature

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