IN-BEAM STUDY OF ^{80}Kr; QUASIPARTICLE EXCITATIONS IN NUCLEI AROUND MASS 80 *)

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The excited states in ^{80}Kr have been studied in the reactions ^{77}Se(α,n), ^{78}Se(α,2n), ^{80}Se(α,4n) and ^{65}Cu(^{18}O,p2n) by using in-beam γ-ray spectroscopy. In addition to $\gamma\gamma$-coincidences, excitation functions and angular distributions also linear polarization of γ-rays and conversion electrons were measured. All together, 32 levels have been identified up to spin 14 at an excitation energy of 6.7 MeV in ^{80}Kr. For 21 of these levels the mean lifetime could be determined by Doppler shift methods and by the pulsed beam γ-timing method. The B(E2) values of 30-60 W.u., derived for many transitions, indicate strong collectivity and the existence of several band structures is suggested. Above 2.5 MeV 2 quasiparticle (qp) excitations become important. The excitation energies of ^{80}Kr and its neighbours ^{77,78,79}Kr, ^{77}Br and ^{81}Rb have been analysed in terms of the cranked shell model. In ^{78,80}Kr two-proton excitations have been found to be responsible for the observed band crossing. Quasiparticle excitations strongly influence the pairing and stabilize the deformation. The anomalies in the negative-parity bands of ^{81}Rb and ^{77}Br are interpreted as a crossing of a 3qp and a 1qp band and the relatively low frequency of the crossing point is ascribed to the blocking effect.

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