Coupling schemes and deformation in light Pb isotopes

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In very neutron deficient Pb isotopes, both experimental and theoretical evidence for shape coexisting configurations has been achieved [1,2]. This phenomenon becomes transparent particularly at the neutron midshell, where the competing structures intrude down to energies close to the spherical ground state. Together with the spherical ground state, they form a unique triplet of 0^+ states in ^{186}Pb, each of which can be associated with a different shape [3]. However, no unambiguous evidence regarding their shape has been achieved in in-beam experiments. To probe this, one could, for example, study rotational coupling in the odd-mass Pb isotopes.

In a recent in-beam recoil-decay tagging experiment at JYFL, we have observed excited states in ^{185}Pb for the first time. In this experiment we collected $\gamma\gamma$-coincidence data that enabled us to construct a level scheme on top of the $13/2^+$ alpha decaying isomeric state in ^{185}Pb. It reveals a band structure which clearly represents strong coupling of an odd $i_{13/2}$ neutron to a prolate core. The interpretation of these new findings will be discussed.

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