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Structure of neutron-rich nuclei around 208Pb

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Information gained on neutron-rich N~126 nuclei is essential for the understanding of nuclear structure in heavy nuclei. Studies around doubly magic systems allow direct tests of the purity of shell model wave functions. From a longer-term perspective, experiments in this region pave the way toward the proposed nuclear-astrophysical r-process waiting point nuclei along the N = 126 shell closure.
In the case of the beta decay of N~126 nuclei there is a competition between allowed and first-forbidden transitions. This is the mass region where first-forbidden (FF) transitions can be dominant, which can have profound implications on their half-lives and therefore on the r-process (A~195 abundance peak).
Recently several experiments were performed at ISOLDE with the aim to study neutron-rich nuclei around 208Pb.
(i) Structure of 208Tl from the beta decay of 208Hg. 208Tl being a one-proton-hole one-neutron-particle nucleus, its excited levels give direct information on the proton-neutron interaction in the Z<82, N>126 quadrant. In addition, the existence of both negative and positive parity states at low excitation energy makes this nucleus an ideal testing ground for the study of the competition between first-forbidden and allowed beta decay.
(ii) Structure of 207Tl from the beta decay of 207Hg. A large number of excited states, several of them of octupole character were observed and compared with calculations.
(iii) Coulomb excitation of 206Hg at safe energies. This gives information about both quadrupole and octupole collectivity.
The presentation will report on recent results and their relevance on the structure of neutron-rich nuclei around 208Pb.

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