In-beam Spectroscopy of ^{231}Pa ◇

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An extended study of ^{231}Pa was carried out by Coulomb excitation where the excitation of the side-bands is enabled by strong K-mixing. By comparing ^{231}Pa to ^{229}Pa the influence of octupole correlations on the nuclear structure is tested. A 105 μg/cm^2 ^{231}Pa oxide target on a 15 μg/cm^2 carbon backing was bombarded by 148 MeV ^{32}S and 255,260,261 MeV ^{58}Ni projectiles. The p-$\gamma\gamma$ coincidences of 20 Compton-suppressed germanium detectors of NORDBALL were read out in coincidence with either a PSD-silicon detector [1] or a multi-PIN-diode detector [2] for the backscattered projectiles. A band with some indication to continue the known part of the 3/2[651] 5/2$^+$band was identified up to 37/2$^+$(see Fig. 1) in addition to the 1/2[530] 3/2$^-$g.s. rotational band [3] by evaluating 400k-events of p-$\gamma\gamma$ coincidences with the Radware97 computer code [4]. Data were calibrated with respect to energy and efficency and then fitted using the GASPAN [5] computer code. Calculations of the depopulation process following Coulomb excitation are on the way using the GOSIA computer code [6] to fit simultaniously the matrix elements for all transitions and all experiments. A comparison with structure calculations in the quasiparticle-phonon-model [7] gives interesting information about the 3/2[651] band or a close lying neighbour, its depopulation and a possible structure change at high spins in the 1/2[530] band, as well as new insight into the nature of the weakly excited 1/2[660] band.

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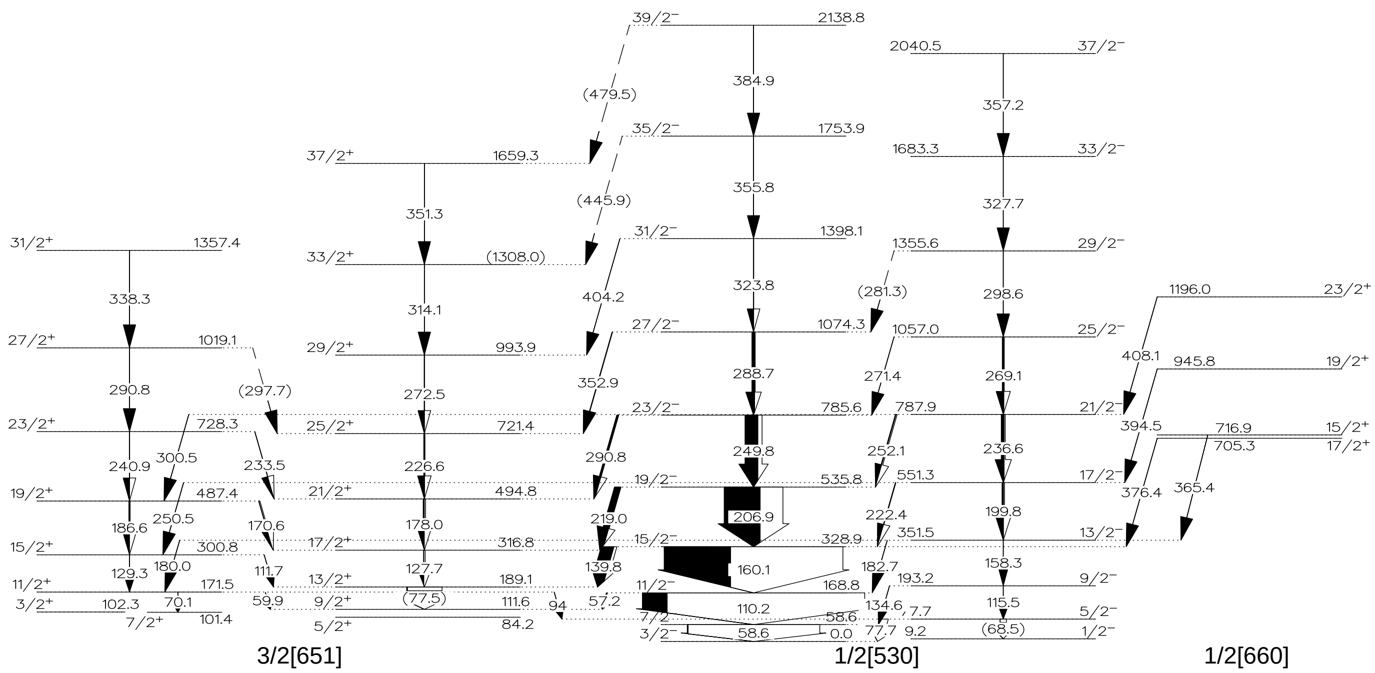

Fig. 1: Proposed levels and their assignment to the known bands in ^{231}Pa according to observed particle-$\gamma\gamma$-coincidences

◇ This work was jointly funded by the following agencies: the Munich and the Niels Bohr Institute Tandem-Accelerator-Laboratories; the Polish State Committee for Scientific Research; DFG, grant Bo 1109/1-5; Volkswagen-Stiftung, grant I/70 407; WTZ grant UKR-036-96