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Title: **Magnetic Rotation in ^{196}Pb***

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Since the first discovery of regular bands of enhanced magnetic dipole transitions in the Pb isotopes [1] a large number of such bands has been found. From their properties it soon became clear that they represent a new mode of nuclear excitation [2], for which the name "Magnetic Rotation" was suggested [3]. The magnetic rotational bands are built on states which result from a coupling of high-spin particle to high-spin hole excitations. In the Pb region, high-spin particle states can be formed by proton excitations into the $h_{9/2}$ and $i_{13/2}$ orbitals and high-spin hole states are available by neutron excitations in the $i_{13/2}$ subshell. Such proton-particle/neutron-hole states have large components of the magnetic moments perpendicular to the total angular momentum. The magnetic moments rotate about the total angular momentum axis giving rise to the enhanced M1 radiation.

We have investigated magnetic rotational bands and their linking transitions to lower-lying states in ^{196}Pb. High spin states in this nucleus have been populated in the ^{170}Er(^{30}Si,4n) reaction and γ-ray coincidences were measured using the Euroball IV spectrometer array. The analysis revealed several new M1 bands in addition to the previously known ones [4] and showed that some transitions within the bands have to be reordered. Most of the bands are now linked to lower levels. On the basis of spins, parities and excitation energies configuration assignments can be made. The results are compared to neighbouring Pb isotopes and to tilted-axis cranking calculations.

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References

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