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V.e. Electromagnetic Properties of 2^+ and $2^{+\prime}$ States of ^{192,194,196}Pt

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(Presented by R. Rougny)

Lifetimes of 2^+ and $2^{+\prime}$ states were determined by delayed coincidences between conversion electrons and γ or X-rays. The lifetimes were calculated by comparison of centroid shifts corresponding to selected cascades. We obtained for ^{194}Pt: $\tau_{2^+} = 50 \pm 5$ ps; $\tau_{2^{+\prime}} = 51 \pm 6$ ps, for ^{196}Pt $\tau_{2^+} = 43.6 \pm 3.0$ ps; $\tau_{2^{+\prime}} = 52 \pm 5$ ps. Branching ratios were determined with a Ge-Li counter taking into account the sum-up effect. The B(M1) and B(E2) values were deduced using lifetimes and known M1/E2 mixtures. Nuclear g-factors are determined by integral spin-rotation measurements performed in the hyperfine field in an iron alloy.

Experimental values presented in Table I show a simultaneously diminishing trend of $B(\mathrm{E2}; 2'\to 2)/B(\mathrm{E2}; 2\to 0)$ and $B(\mathrm{E2}; 2'\to 0)/B(\mathrm{E2}; 2\to 0)$ ratios vs atomic mass. While allowed E2 transition speeds and the equality of g_{2^+} and $g_{2^{+\prime}}$ factors are well described by the microscopic analysis of Kumar and Baranger, it fails to explain $B(\mathrm{E2}; 2'\to 0)$ probabilities and magnetic properties. Experimental B(E2) and $g_{2^+}/g_{2^{+\prime}}$ ratios can be fitted on the basis of the third order anharmonic model of G. Alaga. Theoretical g-factors calculated using the M1 operator of Greiner (Table I) are in good agreement with experimental ones.

Table I.

Quantity \ Nucleus		^{192}Pt	^{194}Pt	^{196}Pt
$B(\mathrm{E2}; 2 \to 0)$	exp	0.440 ± 0.020	0.380 ± 0.016	0.310 ± 0.012
$B(\mathrm{E2}; 2' \to 2)$	exp	0.94 ± 0.10	0.60 ± 0.07	0.342 ± 0.034
$10^3 B(\mathrm{E2}; 2' \to 0)$	exp	4.7 ± 0.5	1.5 ± 0.2	$\leqslant 6\cdot 10^{-4}$
$10^3 B(\mathrm{M1}; 2' \to 2)$	exp	0.55 ± 0.15	$0.17 {+0.06 \atop -0.04}$	0.8 ± 0.1
$\dfrac{B(\mathrm{E2}; 2' \to 2)}{B(\mathrm{E2}; 2 \to 0)}$	exp	2.14 ± 0.22	1.58 ± 0.19	1.10 ± 0.11
	th	1.70	1.65	1.55
$10^3 \dfrac{B(\mathrm{E2}; 2' \to 0)}{B(\mathrm{E2}; 2 \to 0)}$	exp	11 ± 1	4.0 ± 0.6	$\leqslant 2\cdot 10^{-3}$
	th	11	4	<0.3
g_{2^+}	exp	$+0.275 \pm 0.016$	$+0.298 \pm 0.018$	$+0.323 \pm 0.020$
	th	0.298	0.294	0.290
$g_{2^{+\prime}}$	exp	$+0.309 \pm 0.044$	$+0.281 \pm 0.047$	
	th	0.298	0.294	0.290

B(E2) and B(M1) values are in $(eb)^2$ and $(\mu_N)^2$ units respectively.

References

1) R. Béraud *et al*: Phys. Rev. **C1** (1970) 303.

2) K. Kumar: *Nuclear models* (Purdue University, 1970).
3) G. Alaga: *Nuclear Theory Course*, Trieste, (1971).
4) W. Greiner: Nuclear. Phys. **80** (1966) 417.

Discussion

T. Tamura (Univ. of Texas): You obtained good agreement between your data and the prediction of Alaga's theory, as far as electromagnetic properties are concerned. I would like to know how the energies compare.

Rougny: Yes, the model fits well the positions of experimental levels except for the $0^{+\prime}$ levels which are predicted too low.