Lifetimes and g-factor measurements in the decay of the 399 keV isomeric state in ^{197}Pt and the quasiparticle-phonon coupling model

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The nuclear levels in ^{197}Pt have been studied from the decay of 95.4 min ^{197}Pt^m. The isomeric state was produced by (n,γ) reaction on the enriched ^{196}Pt. The γ-ray spectra have been observed with a hyperpure Ge detector and a large volume Ge(Li) detector. The half-lives of the 399 keV and the 53 keV states were determined with improved precision. The results are $T_{1/2}$ (399 keV) $=95.41\pm0.18$ min and $T_{1/2}$ (53 keV)$=16.58\pm0.17$ ns. The g factor of the 53 keV $5/2^-$ state has been measured by the gamma-gamma time differential perturbed angular correlation method in an external magnetic field of 25.1 kG using the 346-53 keV gamma cascade. The value of the g factor was obtained to be $+0.335\pm0.010$. This result is compared with the known g factors of the similar states in ^{195}Pt, and in ^{197}Hg and ^{199}Hg, and also with theoretical calculations based on the quasiparticle-phonon coupling scheme. The possibility of using the 346-53 keV gamma cascade in ^{197}Pt in the future time differential perturbed angular correlation studies is discussed.

[RADIOACTIVITY ^{197}Pt^m [from ^{196}Pt$(n,\gamma)^{197}$Pt^m]; measured E_γ, $I_\gamma(t)$, $\gamma\gamma(t)$, $\gamma\gamma(\theta,T,H)$, $T_{1/2}$; deduced $B(E2)$, μ; calculated $B(E2)$, μ; Ge(Li), Ge hyperpure, NaI(T1) detectors. Enriched target.]

INTRODUCTION

Although considerable experimental data on the low-lying levels in odd-A Pt and Hg isotopes have been reported,[1,2] the understanding of the structure of these nuclei is still unsatisfactory. These isotopes show many similar features; for example, the g factors of the first $\frac{5}{2}^-$ state in ^{195}Pt, ^{197}Hg, and ^{199}Hg are quite similar.[3,4] In addition, the enhancement factor for the $\frac{5}{2}{}^-_1 \rightarrow \frac{1}{2}{}^-_1$ $E2$ transition is approximately ten or more in ^{195}Pt, ^{197}Pt, ^{197}Hg, and ^{199}Hg isotopes, which should indicate the predominantly collective character of the transition.[5–8] On the other hand, recent measurements have shown[9] that the quadrupole moments of the first $\frac{5}{2}^-$ state in ^{197}Hg and ^{199}Hg differ by a factor of approximately 10, indicating that some of the properties of these nuclei might change suddenly in going from one isotope to the other. This is not surprising since these nuclei are situated in a transitional region where the shape of the nucleus can change suddenly from a sphere to a highly deformed spheroid. These nuclei consequently offer an excellent opportunity to test our ideas about the phase transitions in the nucleus.[10]

It has been known for a long time that the interplay of single-particle and collective degrees of freedom had an important role in the description of the low-lying levels of odd Pt and Hg isotopes. As a matter of fact, de-Shalit[11] pointed out in 1961 that the properties of the first two excited states $\frac{5}{2}^-$ and $\frac{3}{2}^-$ in ^{199}Hg could be understood in terms of the core-excitation model by coupling of the $p_{1/2}$ neutron to the first 2^+ state of the neighboring even-even nucleus. Later on, it was noted by Gal[12] that such a simple model, however, could not be applied to the case of ^{195}Pt, and he suggested a somewhat different mechanism where an admixture of the first two 2^+ states in the even-even core contribute to the formation of the two $(\frac{5}{2}^-, \frac{3}{2}^-)$ doublets. This picture gave a fairly good agreement in the case of ^{195}Pt for the energies and the transition rates. However, with the exception of the $\frac{5}{2}^-$ state at 130 keV, it could not explain the observed g factors of these states. Kalish and Gal[13] and Vianden and Krien[14] have used a similar approach in order to account for the magnetic moments of the 134 and 158 keV states in ^{197}Hg and ^{199}Hg, respectively, but with limited success. It appears that the calculations of the magnetic moments in these cases are quite sensitive to the admixture of higher configurations and even to small single-particle contributions.

The properties of odd Pt and Hg nuclei were calculated by Kisslinger and Sorensen[15] by coupling one quasiparticle to the harmonic quadrupole vibrations. More recently Fenyes *et al.*[16] have used an extended version of this coupling scheme, which consists of using an anharmonic quadrupole vibrator in the calculation of the energy spectra of odd Hg nuclei. In both calculations the spins and parities of the low-lying states are $\frac{1}{2}^-$, $\frac{3}{2}^-$, and $\frac{5}{2}^-$, in agreement with the experiments; but neither of the theoretical results correctly describe the spins of the ground states. It was pointed out by Fenyes *et al.*[16] that such small energy shifts in the framework of the approximations used may be due to correlations which were neglected. Clearly the agreement between the experimental and calculated energy spectrum alone does not constitute a rigorous test of the model, which in addition should be able to account for the observed electromagnetic properties of the nuclei.

Our present measurement of the g factor of the 53 keV $\frac{5}{2}^-$ state in ^{197}Pt had twofold interest: (a) to provide an experimental value of the magnetic moment to further elucidate the nature of this state and (b) to investigate the possibility of using the 346-53 keV gamma cascade in the time differential perturbed angular correlation (TDPAC) studies. The 95.4 min $\frac{13}{2}^+$ state of ^{197}Pt almost exclusively depopulates by the cascade with 346 and 53 keV γ rays and the large theoretical angular correlation coefficient $A_{22}=0.2207$ for the cascade makes it quite attractive for the perturbed angular correlation experiments. The half-life of the intermediate state [$T_{1/2}$ (53 keV)$\simeq$16 ns] (Ref. 7) is in the range where the time differential method, which yields the maximum information regarding the interaction, can be employed. It is essential, however, to know the precise value of the nuclear moment of the state before it can be used in the TDPAC studies. We have measured the g factor of the 53 keV state by the gamma-gamma TDPAC method in an external magnetic field of 25.1 kG using the 346-53 keV gamma cascade. In addition we have remeasured the half-lives of the 399 and 53 keV states with improved precision over the previously reported values. Theoretical calculations have been carried out for the magnetic moment of the first $\frac{5}{2}^-$ state and for the $B(E2;\, \frac{5}{2}{}^-_1 \rightarrow \frac{1}{2}{}^-_1)$ value in the ^{197}Pt nucleus, and also in ^{195}Pt, ^{197}Hg, and ^{199}Hg nuclei, using the quasiparticle-phonon coupling model. The results are compared with the experimental data.

EXPERIMENTAL PROCEDURE AND RESULTS

The radioactive sources of 95.4 min ^{197}Pt^m were obtained by neutron irradiation of thin platinum foils ($\simeq$10 mg/cm^2) containing 98.5% ^{196}Pt. The neutron irradiations were carried out in the RPI at Sacavém, Lisbon (Portugal) and in the IEA-R1 reactor at São Paulo, Brasil, with a flux of $\simeq 10^{13}$ n/cm^2 s. Since repeated irradiations were necessary for the experiment, a number of foils were prepared and any given foil was again irradiated only after a cooling period of 4–5 d in order to reduce the contributions from the decay of 18 h ^{197}Pt. The only other impurity in the sample was that of 30 min ^{199}Pt present in a small quantity.

The direct γ-ray spectrum was observed with a hyperpure germanium detector as well as with a Ge(Li) detector. The decay of the 399 keV isomeric state was followed for approximately 9 h observing the 346 and 279 keV γ rays. For this purpose we utilized a 110 cm^3 Ge(Li) detector in conjunction with a PDP-15 computer based multichannel analyzing system. The computer recorded the γ-ray spectrum for 10 min at regular intervals of time and integrated the photopeaks. A pulser gated by the busy signal from the computer was employed to monitor the dead time of the counting system. The photopeak areas were corrected for dead time during the counting periods and the half-life was determined from the photopeak areas of the γ rays by the usual least square fitting procedure to an exponential function.

The half-life of the 53 keV state was determined by the delayed γ-γ coincidence method utilizing the 346-53 keV gamma cascade. A 38×25 mm NaI(T1) detector and a 38×3 mm NaI(T1) detector, both coupled to the RCA 8850 photomultiplier tubes, were utilized for detecting the 346 and 53 keV γ rays, respectively. A conventional slow-fast coincidence system with constant fraction discriminators in conjunction with a time to pulse height converter and a multichannel analyzer was utilized for recording the time spectrum. The time resolution of the equipment was measured by using the 343 keV γ-ray and 53 keV x-ray cascade in the decay of ^{175}Hf. The time calibration was made by using the ORTEC-462 time calibrator. The detectors were placed at 180° to each other as close as possible to the source. Rather weak sources were used in order to keep the random coincidences rate low.

For our time differential experiment for the g-factor measurement we utilized a similar setup as for the lifetime measurement except that two 50×50 mm NaI(T1) detectors coupled to the RCA 8850 and RCA 8575 phototubes through 30 cm long Lucite light guides were used to detect the 53 and 346 keV γ rays, respectively. A magnetic field of 25.1 kG supplied by a water cooled electromagnet was applied perpendicular to the plane of detectors. Delayed coincidence spectra for alternate directions of the magnetic field were stored in two different subgroups of the multichannel analyzer memory and the field direction was changed every 10 min with the two detectors maintained fixed at 135° with respect to each other. In this manner each source was measured for 180 min before replacing it with a new source. A total of 80 sources were utilized for this experiment.

The low energy part of the γ-ray spectrum in the decay of ^{197}Pt taken with the hyperpure germanium detector is shown in Fig. 1. The γ rays in the decay of ^{199}Pt and ^{199}Au as well as the Pt and Au x rays are also seen in this spectrum. The use of a hyperpure germanium detector permitted a clear observation of the 53 keV γ ray along with the 346 keV γ ray in the ^{197}Pt^{m} decay. The decay curves for the 346 and 279 keV γ rays are shown

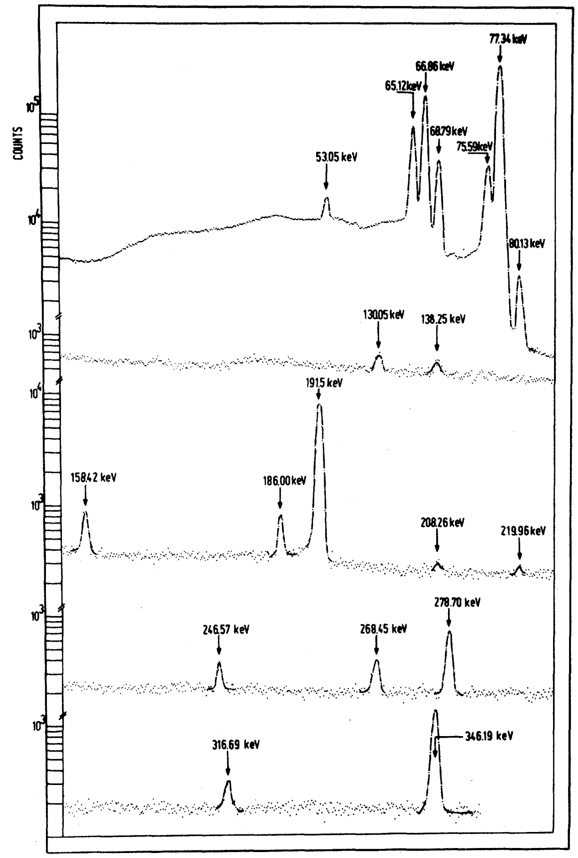

FIG. 1. The low energy γ-ray spectrum in the decay of ^{197}Pt taken with a hyperpure germanium detector.

in Fig. 2. Solid lines are the least square fit of the data to the function, $\ln N(t) = \ln No - \lambda t$. The values of the half-lives determined are 95.44 ± 0.18 and 95.38 ± 0.34 min for the 346 and 279 keV γ rays, respectively.

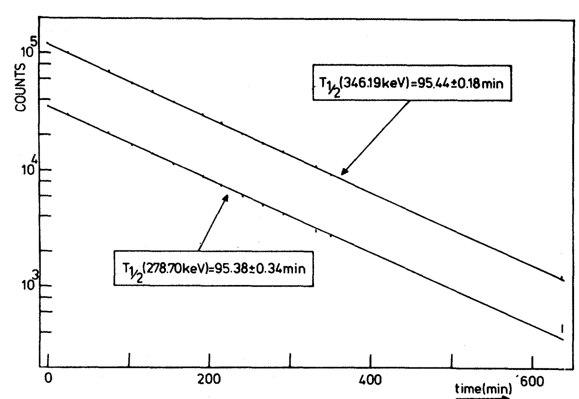

FIG. 2. The decay curves for the 346 and 279 keV gamma rays.

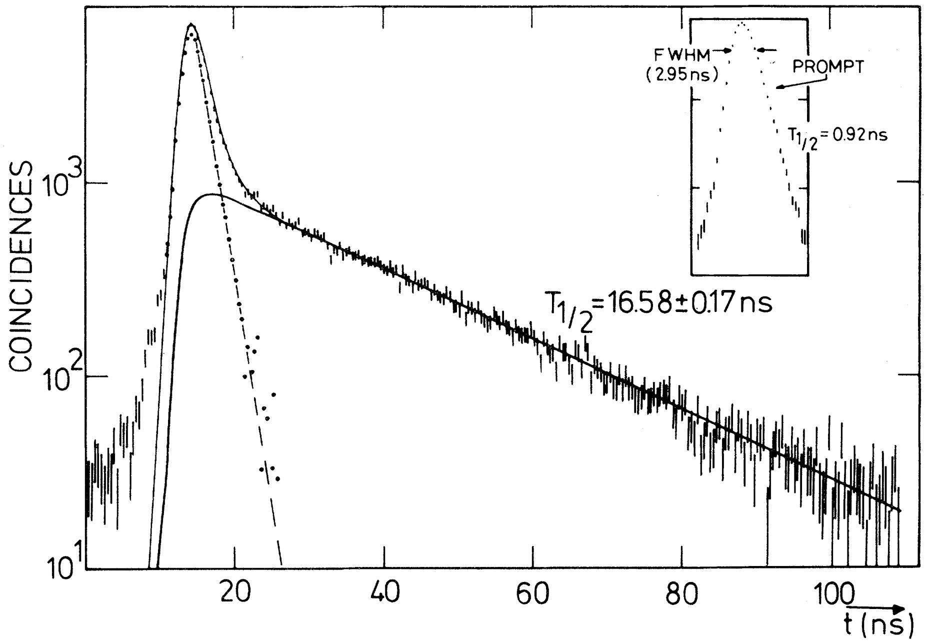

FIG. 3. The delayed gamma-gamma coincidence spectrum of the 346−53 keV γ cascade.

The time distribution of the delayed coincidences for the 346-53 keV cascade is presented in Fig. 3. The experimental data were least square fitted by assuming a function which is the sum of two exponential functions. The slow decaying component gave the half-life of the 53 keV state $T_{1/2} = 16.58 \pm 0.17$ ns, while the fast decaying component gave a half-life of the order of 1 ns, most probably a contribution from the decay of ^{199}Pt. The prompt time distribution curve as determined by the use of a ^{175}Hf source is shown in the inset in Fig. 3.

The asymmetry ratio $R(t,\theta=135°) = (N\uparrow - N\downarrow)/(N\uparrow + N\downarrow)$ calculated from the measured time spectra for the alternate directions of the magnetic field are plotted in Fig. 4. The solid curve is the least square fit of the experimental data to the function $R(t)=A\ \sin 2\omega_L t$. The data corresponding to the initial 25 ns were not considered in the least square fit as they suffered from prompt contribution coming from the decay of ^{199}Pt. The prompt time resolution in this experiment was approximately 5.5 ns (FWHM), as compared to the experiment for the lifetime measurement, 2.9 ns (FWHM). This was due to the use of larger detectors as well as rather long light guides coupled to the detectors and photomultipliers. The resulting value of the Larmor frequency ω_L is 40.3 ± 1.2 MHz and the calculated g factor is 0.335 ± 0.010.

DISCUSSION OF RESULTS

To the ^{197}Pt ground state has variously been assigned a spin and parity $\frac{1}{2}^-$ or $\frac{3}{2}^-$. Haverfield *et al.*,[17] however, ruled out the possibility of $\frac{3}{2}^-$ based upon their measurement of the decay properties of the 279 keV γ ray in ^{197}Au. The half-life of the 399 keV state in ^{197}Pt as determined by these authors from the 346 and 279 keV γ rays are 94 and 99 min, respectively. They therefore placed an upper limit on the ^{197}Pt ground state feeding of the 279 keV $\frac{5}{2}^-$ level in ^{197}Au as $<0.01\%$ and justi-

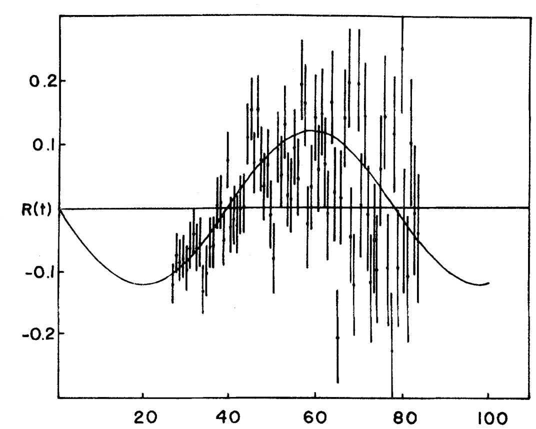

FIG. 4. Spin$_{\text{precession}}$ of the magnetic moment of the 53 keV state in the external magnetic field of 25.1 kG.

fied the assignment for the ^{197}Pt ground state as $\frac{1}{2}^-$. The present measurement shows that both the 346 and 279 keV γ rays decay with the same half-life of 95.4 min, suggesting an almost negligible feeding of the 279 keV level of ^{197}Au, and therefore further confirms that the correct assignment for the ^{197}Pt ground state is $\frac{1}{2}^-$ rather than $\frac{3}{2}^-$.

Two earlier measurements of the half-life of the 53 keV state are by Malmskog[6] ($T_{1/2}=18.5\pm1.5$ ns) and Gerdau *et al.*[7] ($T_{1/2}=16.5\pm1.5$ ns). These measurements, although they agree with each other within the experimental errors, have a nearly 10% error in the value of the half-life itself. We therefore decided to remeasure this half-life and obtained a more precise value $T_{1/2}=16.58\pm0.17$ ns. The improved precision in the value of the half-life obtained in the present experiment is essentially due to a better time calibration through the use of an ORTEC 462 time calibrator.

The time differential experiment, in addition to yielding the frequency of interaction, also gives information on the amplitude or the effective anisotropy observed, which must be satisfactorily accounted for. The theoretical angular correlation coefficient for the 346−53 keV cascade, $A_{22}=0.2207$, after appropriate solid angle corrections, reduces to a value of 0.170, which is approximately equal to the observed A_{22} (exp.)$=0.166\pm0.015$. This result is in agreement with the expectations since the platinum metal has a cubic structure and therefore no quadrupole interaction should be present to influence the A_{22} value. In addition, the results show that there is no significant radiation damage caused by the repeated neutron irradiation of the samples.

QUASIPARTICLE-VIBRATION COUPLING CALCULATIONS

The quasiparticle-phonon coupling scheme used by Kisslinger and Sorensen[15] was generated from the short range pairing plus long range quadrupole residual interaction. Here we start directly from the Bohr-Mottelson[18] particle-vibrator coupling (PVC), which is equivalent. In this approach the odd-N nucleus is treated as consisting of a core (even-even neighbor) capable of collective surface vibrations coupled to an extra-core neutron which has several single-particle levels available. The partial occupancy of the single-particle shell is accounted for by means of quasiparticle formulation.

The total Hamiltonian of the coupled system is given by

$$H=H_c+H_{\text{sp}}+H_{\text{int}} ,$$

where H_c and H_{sp} are the Hamiltonians associated with the harmonic quadrupole fields of the even Pt core and the motion of an extra-core neutron in an effective spherical potential, respectively. H_{int} represents the core-particle interaction energy and is given by the expression

$$H_{\text{int}}=\frac{-\beta}{\sqrt{5}}k(r)\sum_{\mu=-2}^{2}[b_{2\mu}+(-)^{\mu}b_{2\mu}^{+}]Y_{2\mu}(\theta,\phi) .$$

Here $b_{2\mu}^{+}(b_{2\mu})$ is the creation (annihilation) operator of the vibrational field, $Y_{2\mu}(\theta,\phi)$ is the normalized spherical harmonic of the angular coordinate of the particle, $k(r)$ is the coupling strength, and β is the quadrupole deformation parameter of the core nucleus.

The main difference between the Kisslinger and Sorensen model and the PVC model employed by us and by Fényes *et al.*[16] is in the use of the form factor r^2 in H_{int} in place of the $k(r)$. Furthermore, from the results and discussion presented in Ref. 16, one might conclude that the anharmonic effects have little influence on the low energy levels of nuclei considered in the present work. Consequently we will not include this higher order effect in our calculation.

The eigenvectors of the coupled system $|\alpha j,NR;IM\rangle$ are chosen as the basis states. Here α represents the quantum numbers of the particle with the exception of the angular momentum $\vec{j}$; $\vec{R}$ is the angular momentum of the N-phonon state; $\vec{I}=\vec{R}+\vec{j}$ is the total angular momentum of the coupled system with Z component M.

The matrix elements of the interaction Hamiltonian are given by

$$\langle\alpha j,NR;IM\,|\,H_{\text{int}}\,|\,\alpha' j',N'R',IM\rangle=(-)^{I+R+1/2}K\beta\left[\frac{(2j+1)(2j'+1)}{4\pi}\right]^{1/2}\begin{pmatrix} j & 2 & j' \\ -\frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}\begin{Bmatrix} j & R & j \\ R' & j' & 2\end{Bmatrix}$$

$$\times\langle NR||b||N'R'\rangle(U_jU_{j'}-V_jV_{j'}),\quad N'\geq N ,$$

where $K=\langle nl\,|\,k(r)\,|\,n'l'\rangle$ is the matrix element of $k(r)$ between the single-particle states and $U_j^2(V_J^2)$ represents the nonoccupation (occupation) probabilities for the state j.

The eigenvectors of the Hamiltonian are expressed as a linear combination of the basis states; i.e.,

$$|E,IM\rangle=\sum_{jNR}C_{j,N,R}(E)\,|\alpha j,NR;IM\rangle\ ,$$

where $C_{j,N,R}(E)$ are the expansion coefficients and E the eigenvalues. The matrix elements of the electric quadrupole and magnetic dipole operators are expressed in the form

$$\langle I_k||M(E2)||I'_{k'}\rangle=(e_p^{\mathrm{eff}}A+e_v^{\mathrm{eff}}B)\mathrm{fm}^2\ ,$$

$$\langle I_k||M(M1)||I'_{k'}\rangle=(g_R^C+g_l^D+g_s^{\mathrm{eff}}E)\mu_N\ .$$

Here $e_p^{\mathrm{eff}}=0.5e$ and $e_v^{\mathrm{eff}}=2.5e$ are the effective single-neutron and vibrator charge, respectively, and $g_R=Z/A=0.4$, $g_l=0$, and $g_s^{\mathrm{eff}}=0.7g_s^{\mathrm{free}}=2.68$ are the corresponding effective gyromagnetic ratios.[16] The quantities A, B, C, D, and E are calculated using the wave functions obtained by diagonalization.

In the present calculations the neutron quasiparticles in Pt and Hg nuclei are assumed to occupy the $2f_{7/2}$, $1i_{13/2}$, $3p_{3/2}$, $2f_{5/2}$, and $3p_{1/2}$ orbitals. The values of the single-particle energies were taken from the work of Kisslinger and Sorensen[15]: $\epsilon(2f_{7/2})=0.0$, $\epsilon(li_{13/2})=0.75$, $\epsilon(3p_{3/2})=1.45$, $\epsilon(2f_{5/2})=1.78$, and $\epsilon(3p_{1/2})=2.35$ (in units of MeV).

In the evaluation of the quantities U_j and V_j one needs to know the value of the pairing strength G. This was determined by requiring that the pairing parameter Δ, resulting from the solution of the gap equations, reproduces the experimental odd-even mass differences. The value of G, Δ, and the Fermi energy λ for the nuclei considered here are listed in Table I. In this table are also included the values of the phonon energies $\hbar\omega$ and the deformation parameter β taken from the experimental data.[19] The only free parameter in the calculation was the coupling strength K which was varied between 20 and 50 MeV. The best overall agreement between the experiment and the theory for the magnetic moment of the $\frac{5}{2}^-$ states and the $B(E2;\frac{5}{2}{}_1^-\to\frac{1}{2}{}_1^-)$ values was obtained for $K=30$ MeV and we present in Table II only the results for this value of the coupling strength.

Below we discuss in more detail the magnetic moment of the $\frac{5}{2}{}_1^-$ state and the $E2$ $(\frac{5}{2}{}_1^-\to\frac{1}{2}{}_1^-)$ transition rate for the ^{197}Pt nucleus. Similar considerations are valid for the remaining nuclei. The calculated wave functions of the $\frac{1}{2}{}_1^-$ and $\frac{5}{2}{}_1^-$ states in ^{197}Pt are

$$|\tfrac{1}{2}{}_1^-\rangle=0.670\,|p_{1/2},00\rangle+0.522\,|f_{5/2},12\rangle+0.464\,|p_{3/2},12\rangle-0.180\,|f_{7/2},24\rangle+0.130\,|p_{3/2},22\rangle;$$

$$|\tfrac{5}{2}{}_1^-\rangle=0.931\,|f_{5/2},00\rangle+0.290\,|p_{1/2},12\rangle+0.156\,|p_{3/2},12\rangle\ .$$

From these one immediately sees that the one quasiparticle and collective degrees of freedom are strongly mixed up in the low-lying states of ^{197}Pt.

As $g_l=0$ the relevant quantities for the magnetic properties are only C and E, which for the $|\frac{5}{2}{}_1^-\rangle$ state are $C=0.114\ \mu_N$ and $E=-0.137\ \mu_N$. The corresponding magnetic dipole moment is $0.860\ \mu_N$, in very good agreement with the measured value $(0.837\pm0.025)\ \mu_N$.

The one quasiparticle and collective contributions to the matrix element $\langle\frac{5}{2}{}_1^-||M(E2)||\frac{1}{2}{}_1^-\rangle$ are incoherent, their numerical values being $A=-0.41\ e\,\mathrm{fm}^2$ and $B=4.93\ e\,\mathrm{fm}^2$. The calculated $B(E2;\frac{5}{2}{}_1^-\to\frac{1}{2}{}_1^-)$ value is 12.9 Weisskopf un-

TABLE I. Relevant parameters for the Pt and Hg cores considered in the calculation.

Core	Δ (MeV)	λ (MeV)	G (MeV)	$\hbar\omega$ (MeV)	β
^{194}Pt	0.900	1.474	0.142	0.33	0.156
^{196}Pt	0.870	1.676	0.147	0.35	0.125
^{196}Hg	0.660	1.426	0.116	0.42	0.129
^{198}Hg	0.690	1.630	0.127	0.42	0.109

TABLE II. Comparison between the experiment and theory for the lifetime and g factor of the $\frac{5}{2}{}_1^-$ state and the $B(E2)$ values for the transition $\frac{5}{2}{}_1^- \to \frac{1}{2}{}_1^-$.

	$T_{1/2}$ ($\frac{5}{2}{}_1^-$) (ns)	$\frac{B(E2)_{exp}{}^a}{B(E2)_{sp}}$	$\frac{B(E2)_{theo}}{B(E2)_{sp}}$	g factor (exp.)	g factor (theo-present)	g factor (theo-other)
^{195}Pt	0.67 (3) (Ref. 1)	8.4 (8)	9.5	0.35 (4) (Ref. 3)	0.405	0.35 (Ref. 12)
^{197}Pt	16.58 (17)	10.6(11)	12.9	0.335(10)	0.344	
^{197}Hg	8.066(8) (Ref. 4)	8.6 (6)	8.3	0.342(6) (Ref. 4)	0.383	0.468 (Ref. 14)
^{199}Hg	2.45 (5)	17.7(13)	13.8	0.352(13) (Ref. 4)	0.365	0.480 (Ref. 13)

[a] $B(E2)_{exp}$ have been calculated from the known lifetimes, experimental conversion coefficients (^{197}Hg, ^{199}Hg, Refs. 1 and 2), and theoretical conversion coefficients (^{195}Pt, ^{197}Pt). The branching ratio values for the 130 keV transition in ^{195}Pt vary between 0.049 and 0.084 (Ref. 1) an average value has been used in the calculation.

its, while the measured value is 10.6 ± 1.1 in the same units.[7]

CONCLUSIONS

As pointed out earlier a recent measurement has shown that the quadrupole moment of the first $\frac{5}{2}^-$ state in ^{197}Hg is more than a factor of 10 smaller in value than that of the corresponding state in ^{199}Hg.[9] Moreover, the $Q(\frac{5}{2}{}_1^-)$ in ^{197}Hg is negative[20] whereas it is positive[21] in ^{199}Hg. It might be quite interesting to investigate whether such a drastic change in the value of $Q(\frac{5}{2}{}_1^-)$ also occurs in going from ^{195}Pt to ^{197}Pt. The present result has demonstrated that a TDPAC experiment can be performed in ^{197}Pt with a reasonable success. On the other hand, a Mössbauer experiment is feasible in the case of ^{195}Pt. It is therefore possible in principle to obtain the quadrupole coupling constants for the $\frac{5}{2}^-$ state in ^{195}Pt and ^{197}Pt and if the measurements can be made in the same noncubic matrix the ratio of the coupling constants would furnish the quadrupole moment ratio. Using the ^{195}Pt and ^{197}Pt implanted in Be, experiments for the measurement of the quadrupole coupling constants are being planned in our laboratory.

Finally, it should be mentioned that although the quasiparticle phonon coupling model reproduces satisfactorily the experimental results for the magnetic moment $\mu(\frac{5}{2}{}_1^-)$ and the $B(E2;\frac{5}{2}{}_1^- \to \frac{1}{2}{}_1^-)$ value in ^{195}Pt, ^{197}Pt, ^{197}Hg, and ^{199}Hg, it does not necessarily mean that the model is an appropriate one. For example, as was the case with the calculations of Kisslinger[15] and Sorenson and Fenyes *et al.*,[16] our calculations also do not predict the ground state spin correctly. In order to be more conclusive with respect to the theory further experimental and theoretical investigations on the nuclei in this mass region are necessary.

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