Reply to ''Comment on 'Prolate-oblate band mixing and new bands in ^{182}Hg' ''

K. S. Bindra,[1,2] P. F. Hua,[3] B. R. S. Babu,[1] C. Baktash,[4] J. Barreto,[3] D. M. Cullen,[4] C. N. Davids,[2] J. K. Deng,[1] J. D. Garrett,[4] M. L. Halbert,[4] J. H. Hamilton,[1] N. R. Johnson,[4] A. Kirov,[3] J. Kormicki,[1,5] I. Y. Lee,[4] W. C. Ma,[1] F. K. McGowan,[4] A. V. Ramayya,[1] D. G. Sarantites,[3] F. Soramel,[2] and D. Winchell[4]

[1]*Physics Department, Vanderbilt University, Nashville, Tennessee 37235*
[2]*Physics Division, Argonne National Laboratory, Argonne, Illinois 60439*
[3]*Chemistry Department, Washington University, St. Louis, Missouri 63130*
[4]*Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831*
[5]*UNISOR, Oak Ridge, Tennessee 37831*

(Received 23 May 1995)

We reply to the preceding Comment. [S0556-2813(96)04505-0]

PACS number(s): 27.70.+q, 29.30.Kv, 23.20.Lv

The authors of the Comment [1] make the following two points.

(1) They correctly point out that a recent measurement [2] of the second 0^+ state in ^{182}Hg was overlooked by Bindra *et al.* [3]. This point is well taken and we apologize for unintentionally omitting the above work from the reference list.

(2) They disagree with the statement made in Ref. [3] that ''Any conclusions about the prolate-oblate energy difference based on the high-spin members may be questioned.'' This sentence states that in ''shape-coexisting'' nuclei, one cannot *in general* use an extrapolation technique to infer the energies of the low-spin states, which are susceptible to perturbation due to band interaction. The argument of Wauters *et al.* [1] is partially based on the similarity between the extrapolated value of 337 keV and the experimental value of 328 keV for the excitation energy of the second 0^+ state in ^{182}Hg. However, this logic is flawed. The fact that a method works in one case (or even many cases) does not prove that its domain of applicability is *universal*.

In Ref. [4], it has been shown that the parametrization used by Wauters *et al.* is a variant of the Harris expansion [5]. Reference [4] has also shown that while the Harris expansion is frequently applicable to the ground-state bands, oftentimes it gives the wrong answer when applied to the excited bands. Moreover, the extrapolated values sometimes vary significantly depending on *how many* or *which* states are used in the fitting procedure. Therefore, at least in the case of the excited bands, one does not know *a priori* whether the answers obtained by the Harris expansion are reliable or not. The fortuitous agreement obtained in the case of ^{182}Hg does not prove the *universal* applicability of the advocated method to bands in all other nuclei with soft potential energy surfaces. Occasionally, when the band interaction is small (as is the case in ^{182}Hg), the method would give a reasonable answer. However, there exist many other cases where the method fails. To show a counterexample, we have calculated the energies of the low-lying yrast states in ^{180}Pt by fitting the energies of the 6^+ to 12^+ members of the ground-state band. We obtained differences of 130, 70, and 24 keV between the fitted and the experimental values of the energies of the 0^+, 2^+, and 4^+ states, respectively. These differences would increase to 190, 123, and 63 keV if we chose to apply a least-squares fit to the energies of the 8^+–14^+ states instead.

Oak Ridge National Laboratory is managed for the U.S. Department of Energy by Lockheed Martin Energy Systems, Inc. under Contract No. DE-AC05-84OR21400.

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