

**COMMENTS ON THE SPIN ASSIGNMENTS OF THE  
YRST BANDS IN  $^{156}\text{Tb}$ ,  $^{158}\text{Ho}$ ,  $^{166}\text{Lu}$  AND  $^{168}\text{Ta}$  AND THE  
SYSTEMATIC TREND OF THE SIGNATURE  
INVERSION IN ODD-ODD NUCLEI AROUND A ~ 160\***

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The low spin signature inversion in odd-odd nuclei is a remarkable phenomenon which provides a way of studying the  $p$ - $n$  coupling scheme in a fast rotating nucleus. In addition, it is widely accepted that the low spin signature inversion in odd-odd nuclei is closely related to the  $\gamma$ -deformation, and therefore it is possible, through the study of signature inversion, to investigate the shape evolution of the nuclei in the mass regions where signature inversion are observed systematically.

Various theoretical attempts have been made to interpret the signature inversion in odd-odd nuclei. However, the theoretical studies and systematic analyses were complicated by the questionable spin assignments of some of the nuclei. For example, although the correctness of the spin assignments of  $^{156}\text{Tb}$  and  $^{158}\text{Ho}$  were doubted and called for the reevaluation of their spin assignments as early as in 1984 [1], the original experimental data of these nuclei are still been studied and fitted by various theoretical works. The main results of this study are given as follows:

1. The spin values of the lowest observed states of yrast bands in  $^{156}\text{Tb}$ ,  $^{158}\text{Ho}$ ,  $^{166}\text{Lu}$  and  $^{168}\text{Ta}$  are reevaluated according to the well-established alignment additivity rule in the A ~ 160 mass region. As the results of these reevaluations, the spin values of the lowest observed states of the yrast band in  $^{156}\text{Tb}$ ,  $^{158}\text{Ho}$ ,  $^{166}\text{Lu}$  and  $^{168}\text{Ta}$  are assigned as (8), (9), (8) and (9) instead of the original values 6 [2], (6) [3], (7) [4] and (10) [5] respectively. These new spin values are further supported by the excitation energy systematics, and as a result of these new spin assignments the irregularities appeared in the systematics trend of signature inversion in odd-odd nuclei of the A ~ 160 mass region are removed.
2. After the reevaluation of the above mentioned spin assignments, the systematic trend of the signature inversion of the odd-odd nuclei in the A ~ 160 mass region (N= 89-95 and Z= 65-73) are reviewed and their systematic behavior as a function of N and Z are presented and discussed.

### References

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