

Study of β -Decay in the Proton-Neutron Interacting Boson-Fermion Model

L. Zuffi¹, S. Brant², N. Yoshida³

¹ Dipartimento di Fisica dell'Università di Milano and Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Via Celoria 16, Milano, 20133, Italy.

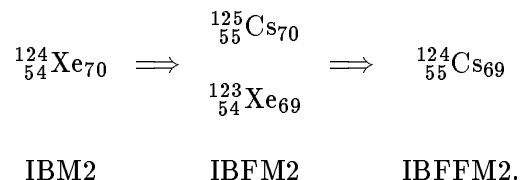
² Department of Physics, University of Zagreb, 10000 Zagreb, Croatia.

³ Faculty of Informatics, Kansai University, Takatsuki, 569-1095, Japan.

The study of nuclear β decay is important in (i) testing nuclear models by analyzing the existing data, because the beta-decay rates are very sensitive to the details of the wave functions, and in (ii) providing reliable information for astrophysical applications.

The interacting boson model (IBM) [1] has been successful in studying the collective properties of nuclei. Developed from the original boson model (IBM) for even-even nuclei, the interacting boson-fermion model (IBFM) [2] treats odd-even nuclei as a coupled system of the bosons and an odd fermion. We have been performing systematic studies on the β decay in the Pd-Rh region [3], the Xe-Cs region [4], and the Ge-As region [5] in IBFM in the version which distinguishes the proton bosons from the neutron bosons (IBFM2). In addition to the energy levels and the electromagnetic properties, we have obtained the beta decay ratios that are obtained in a parameter-free calculation. The results will be presented.

The interacting boson-fermion-fermion model (IBFFM) [6] has been developed for the description of odd-odd nuclei. In the present report, we try to make a systematic description of the even-even, odd-even and odd-odd nuclei in the Xe-Cs region. For example, the odd-odd ^{124}Cs can be treated in the following chain:



In fact, Gizon *et al.* [7] studied this chain in the IBFFM and obtained good agreement between the experiment and the calculation. Our present study is in the proton-neutron IBFFM (IBFFM2). We have already obtained reasonably good results for the energy levels and the branching ratios. The preliminary results will be presented. The calculation is being extended to the β -decay between the even-even nucleus ^{124}Xe and the odd-odd nucleus ^{124}Cs .

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