

The beta-decay properties of $N=Z$ nuclei: Role of neutron-proton pairing and the shell model interpretation

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We have done a systematic beta-decay study of the even-even nuclei $A=58,62,66$, and 70 into $N=Z$ odd-odd nuclei using the large-scale shell model. It was reported that the enhancement in GT transition strength in 70Br compared to the beta-decay of lighter 62Ge might be an indication of increased neutron-proton pairing correlation. To explore the np correlation in nuclei, we have employed an interaction involving only pairing matrix elements and observed that the GT strength does not necessarily increase with increasing np pairing. We have further compared those results with realistic calculations in the fp and f5/2pg9/2 model space and examined the contribution from different orbitals in the GT strengths. We have also modified the single-particle energies and the $T=0$ monopole pairing matrix elements of the interaction in order to understand the impact on $B(\text{GT})$.

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