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Evidence for multiple octupole correlations in nuclei

High spin states of odd odd ^{152}Eu were populated using the $^{150}\text{Nd}(^7\text{Li}, 5n)$ reaction with the beam energy of 42 MeV. Two positive and two negative parity rotational bands were observed in this nucleus, as well as two sets of E1 linking transitions between the opposite parity bands 1&3 and bands 1&4. Based on the measured lifetimes of the levels, it is found the $B(E1)$ values in ^{152}Eu is relatively large (larger than 10^{-5} W.u.), which indicate multiple octupole correlations exist in ^{152}Eu . A systematic comparison with neighboring odd A nuclei shows that $B(E1)$ in ^{152}Eu is significantly reduced, perhaps due to changes in the number of nucleons that alter the positions of the nucleus's center of charge and center of mass.

Notes

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