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Tensor force effect on pairing correlations for the Gamow–Teller transition

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We investigate the tensor force (TF) effect on the Gamow–Teller (GT) transition strength distributions in 42Ca, 46Ti, and 18O, which are known to have strong low-energy GT states,the so-called low-energy super GT (LeSGT) transition, peculiar to nuclei retaining a neutron number N = Z + 2. The TF is explicitly taken into account in the pairing channels of the residual interaction on top of the mean field described by a deformed Woods–Saxon potential. The pairing matrix elements (PMEs) comprising isoscalar and isovector parts,which consistently describe both the ground and the GT excited states, are calculated by a Brückner G-matrix based on the charge-dependent Bonn potential. By switching the TF on and off in the PMEs, we deduce meaningful correlations between the TF and the GT strength distributions. It is found that an attractive TF affects not only the ground state but also plays a crucial role in shifting the main GT peak to the low excitation-energy region leading to the LeSGT.

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