Pairing within the self-consistent quasiparticle random-phase approximation at finite temperature and angular momentum

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Abstract

Nuclear pairing properties are studied within an approach that includes the quasiparticle-number fluctuation (QNF) and coupling to the quasiparticle-pair vibrations at finite temperature and angular momentum. The numerical calculations are performed within a doubly-folded equidistant multilevel model as well as several realistic nuclei. The results obtained show that, in the region of moderate and strong couplings, the sharp transition between the superconducting and normal phases is smoothed out, resulting in a thermal pairing gap, which does not collapse at the BCS critical temperature, but has a tail, which extends to high temperature. The theory also predicts the appearance of thermally assisted pairing correlations in hot rotating nuclei.

References

[1] N. Quang Hung and N. Dinh Dang, Phys. Rev. C 76(2007)054302

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