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Estimation of pairing delta residual interaction strengths based on semi-classically averaged nuclear pairing properties

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Proper determination of pairing residual interaction strengths is crucial in any microscopic mean-field approaches. This has been traditionally performed by fitting the pairing strengths such that the experimental moment of inertia or the odd-even mass differences is reproduced. The equivalence of the two methods in the case of a constant matrix element has been investigated for nuclei in the rare earth region [1]. The recent work [2] proposed a new approach based on the Strutinsky averaging method to estimate the constant matrix element pairing strengths based on the underlying single-particle level densities with connection to some semi-classically averaged experimental data on odd-even mass difference. Using the estimated pairing strengths, it has been shown that the Hartree-Fock plus BCS calculated moment of inertia [2] and odd-even mass differences agree [3] well with data. Using the method developed in [2] as a starting point, we now propose a method to estimate the pairing strengths of a pairing interaction namely the volume delta pairing [4]. The appropriateness of the approach is assessed by comparison of moments of inertia calculated with the delta force with experimental data. Our approach is expected to be relevant in particular for extrapolations to nuclei or nuclear states where fitting to experimental data is impossible or inappropriate.

References:
[1] Nurhafiza M. Nor, Nor-Anita Rezle, Kai-Wen Kelvin-Lee, Meng-Hock Koh, L. Bonneau, and P. Quentin, Phys. Rev. C 99, 064306 (2019).
[2] Meng-Hock Koh and P. Quentin, Phys. Rev. C 110, 024311 (2024).
[3] T.V. Nhan Hao, N.N Bao Nguyen, D. Quang Tam, P. Quentin, Meng-Hock Koh and L. Bonneau, Chin. Phys. C 49 (3), 034101 (2025).
[4] Meng-Hock Koh, P. Quentin and L. Bonneau, (article under preparation).

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