Abstract Submitted
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Role of fluctuations on the pairing properties of nuclei in the random spacing model[1] M. A. AL MAMUN, C. CONSTANTINOU, M. PRAKASH, Ohio University — Exploiting the similarity between the bunched single-particle energy levels of nuclei and of random distributions around the Fermi surface, pairing properties of the latter are calculated to establish statistically-based bounds on the basic characteristics of the pairing phenomenon. The influence of thermal fluctuations, expected to be large for systems of finite number of particles [1,2], were investigated using a semiclassical treatment of fluctuations. When the average pairing gaps along with those differing by one standard deviations are used, the characteristic discontinuity of the specific heat at T_c in the BCS formalism was transformed to a shoulder-like structure indicating the suppression of a second order phase transition as experimentally observed in nano-particles and several nuclei. To the extent that the sp levels of the RS model resemble those of nuclei that exhibit considerable dependence on choices of the energy density functionals and pairing schemes used, our results indicate the variation to be expected in the basic characteristics of the pairing phenomenon in nuclei. [1] L. G. Moretto, Phys. Lett. B 40, 1 (1972). [2] Al Hassid, in "50 years of Nuclear BCS: Pairing in Finite Systems", edited by R. A. Broglia and V. Zelevinsky, p. 608, Singapore, 2013.

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