

Abstract Submitted  
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**Superfluidity in small 2D systems of trapped charged bosons**<sup>1</sup> J. BOENING, A. FILINOV, M. BONITZ, University Kiel, YU. E. LOZOVIK, Inst. Spectroscopy, Troitsk, Russia — Superfluidity in a trapped cloud of quantum particles is defined using the cloud’s response to a rotation of the external potential (non classical moment of inertia, NCRI). While NCRI originates from inter-particle interactions. in finite trapped quantum systems, due to the discrete nature of the spectrum, the NCRI effect occurs in any case regardless of the presence of interactions. We investigate small bosonic systems in order to distinguish between effects related to a finite system size, inter-particle interactions and quantum statistics. Our results are obtained with first principle path-integral Monte-Carlo (PIMC) simulations [1] and are compared to analytical expressions for the ideal case based on permutations cycles [2], respectively. Finally, coexistence of a mesoscopic bosonic crystal and superfluidity is studied. [1] A. Filinov and M. Bonitz, in: “Introduction to Computational Methods in Many Body Physics”, M. Bonitz and D. Semkat (eds.), Rinton Press Inc., Princeton 2006 [2] J. Schneider and H. Wallis, Eur. Phys. J. B 18, 507 (2000)

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