

Pairing effects in the normal phase of a two-dimensional Fermi gas

Pierbiagio Pieri^{1,2}

¹ *School of Science and Technology, Physics Division, University of Camerino, Italy*

² *INFN, Sezione di Perugia, Perugia, Italy*

In recent experiments [1, 2], a pairing gap was detected in a two-dimensional (2D) Fermi gas with attractive interaction at temperatures where superfluidity does not occur. A relevant question is whether this gap is a pseudogap phenomenon or is due to a molecular state, which is always present in 2D. In this talk I will discuss how the boundary between the pseudogap and molecular regimes can be set, and compare the theoretical results obtained by using a t-matrix approach [3] with the above experimental data for a 2D Fermi gas. I will also show that pseudogap phenomena occurring in 2D and 3D can be related through a variable spanning the BCS-BEC crossover in a universal way.

[1] M. Feld, B. Fröhlich, E. Vogt, M. Koschorreck, and M. Köhl, *Nature* **480**, 75 (2011).

[2] P. A. Murthy, M. Neidig, R. Klemt, L. Bayha, I. Boettcher, T. Enss, M. Holten, G. Zürn, P. M. Preiss, and S. Jochim, arXiv:1705.10577 (2017).

[3] F. Marsiglio, P. Pieri, A. Perali, F. Palestini, and G. C. Strinati, *Phys. Rev. B* **91**, 054509 (2015).