Jozef Stefan Institute, Department of Theoretical Physics

Solid State Group Seminars

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Variational wave functions for correlated electron systems

I give a review of recent developments on the possibility to describe strongly-interacting systems by variational wave functions obtained by inserting electron-electron correlation on top of Slater determinants. In this regard, both Jastrow and backflow terms are considered.[1,2] The former one is the generalization of the Gutzwiller (soft) projection to include long-range density-density correlations and is nowadays widely used; instead, backflow terms have been defined and introduced only quite recently in strongly-interacting lattice models and make it possible to include electron-electron correlation in the Slater determinant.[3]
I discuss the accuracy of this approach for both weak and strong couplings and how it is possible to describe the metal-insulator transition, as well as the Mott insulator. Applications for the Hubbard model on frustrated lattices will be presented in the following talk by L.F. Tocchio.[4,5]
[1] M. Capello, F. Becca, M. Fabrizio, S. Sorella, and E. Tosatti, Phys. Rev. Lett. 94, 026406 (2005). [2] L.F. Tocchio, F. Becca, A. Parola, and S. Sorella, Phys. Rev. B 78, 041101 (2008). [3] L.F. Tocchio, F. Becca, and C. Gros, Phys. Rev. B 83, 195138 (2011). [4] L.F. Tocchio, H. Feldner, F. Becca, R. Valenti, and C. Gros, Phys. Rev. B 87, 035143 (2013). [5] L.F. Tocchio, C. Gros, R. Valenti, F. Becca, Phys. Rev. B 89, 235107 (2014)

Monday, March 30, 2:30pm

Čajna soba F1, Jozef Stefan Institute