

Out-of-equilibrium dynamics in correlated systems: a variational approach

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There is increasing interest in correlated materials driven far away from equilibrium conditions. On one side, one hopes that probing the time evolution of these materials far from equilibrium may unveil important dynamical properties otherwise inaccessible by other techniques. On a more practical side, since correlated materials are often on the verge of a Mott metal-to-insulator transition, it could be feasible to switch on/off their conducting properties much faster than e.g. changing temperature or pressure, a great opportunity for possible applications.

In this talk, I shall present a novel technique to study correlated systems in out-of-equilibrium conditions, which is based on a proper time-dependent extension of the Gutzwiller approximation.[1, 2] In spite of its simplicity and degree of approximation, this method has the capability to deal at the same time with the dynamics of both low energy quasiparticles and high energy Hubbard bands, a distinctive feature of correlated metals close to a Mott transition. I will present some applications of the technique that could be relevant to pump-probe experiments in correlated materials.[3]

[1] M. Schiró and M. Fabrizio, *Phys. Rev. Lett.* **105**, 076401 (2010).

[2] M. Schiró and M. Fabrizio, *Phys. Rev. B* **83**, 165105 (2011).

[3] P. André and M. Fabrizio, unpublished (2011).