Seminar/Talk

Meson theory of magnetic polarons in hole-doped anti-ferromagnets

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By doping a fermionic Mott insulator at half filling, the anti-ferromagnetic (AFM) ground state is destroyed and a high-Tc superconducting phase can be reached. To unravel the physics of the hole-doped regime, an important first step is to understand the behavior of a single hole in the AFM. In analogy with the polaron problem, where a mobile impurity interacts with a surrounding bath, one can expect a so-called magnetic polaron to form when a hole is introduced into the AFM. The analogy between these two problems will be the main topic of this talk. After providing an overview of the Bose polaron problem an impurity strongly interacting with a Bose-Einstein condensate it will be argued that the magnetic polaron is more than just a hole dressed by magnetic excitations. Instead, the strong correlations in this system require a different physical picture, which will be provided in the strong-coupling limit where the hole-hopping is much faster than spin-exchange interactions. Very recently, the Heisenberg AFM has become accessible for quantum-gas microscopes with ultracold fermions in optical lattices. A brief overview of recent experimental progress will also be given.

Tuesday, September 19, 2017 11:00am - 12:30pm
Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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