Contribution ID : **12** Type : **not specified**

F. Scazza - Ultracold atomic Fermi gases in the strongly correlated regime (part 1)

mercoledì 18 settembre 2019 11:00 (90)

Ultracold atomic gases provide a formidable platform for quantum simulation of a variety of models initially introduced in condensed matter physics or other areas. One of the most promising applications of quantum simulation is the study of strongly correlated Fermi gases, for which accurate theoretical predictions are challenging even with state-of-the-art approaches. In this lecture, I will first briefly review the foundations of atom-light interactions and explain how these are exploited to cool, trap and manipulate atoms. I will then introduce ultracold atomic Fermi gases, from the non-interacting case to the famous strongly correlated BEC-BCS crossover. I will also describe some recent experiments, highlighting the unique and fascinating aspects of crossover superfluids. In the second part of the lecture, I will present a general introduction to the Fermi-Hubbard model and outline its realization with ultracold fermions in optical lattices, highlighting the foremost experimental achievements so far. To conclude, I will shortly discuss some novel approaches to quantum simulation of quantum magnetism and long-range interacting systems.