AVVISO DI SEMINARIO

DATA: **5 Febbraio 2013** ORE**: 11:00**

RELATORE: **Dr. Alessandro Romito**

ISTITUTO DI APPARTENENZA: Università di Berlino

TITOLO DEL SEMINARIO **:** **Weak measurements in solid state systems: The case of quantum state discrimination**

AULA: Aula Querzoli LENS

ABSTRACT

The measurement of any observable in quantum mechanics is a probabilistic process described by the projection postulate. As opposed to projective (strong) measurement, weakly measuring an observable (i.e. measuring it while weakly disturbing the system), provides only partial information on the state of the system. It has been proposed that a two-step procedure --weak measurement followed by a strong one, where the outcome of the first measurement is kept provided a second post-selected outcome occurs-- leads to a so-called weak value [1]. Such a weak value may lie well beyond the range of strong values and may happen to be complex. This concept found successful applications in foundation of quantum mechanics, quantum optics, and, recently, in solid state systems.
In the talk I will review the fundamental aspects of the weak value concept and its realization is solid state systems. I will then focus on the recently proposed application of weak-measurement-based protocols to quantum state discrimination, leading to an amplified signal to noise ratio in discriminating between unknown states. I will present a recent experiment in quantum optics proving the validity of such amplification procedure and discuss further applications to solid state systems.

[1] Y. Aharonov, D. Z. Albert, and L. Vaidman, Phys. Rev. Lett. 60, 1351 (1988).

Referente: Dott. Augusto Smerzi