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**“An introduction to the BCS-BEC
crossover“**

**Thursday, July 12th, 2018, 4:15 p.m.
Building C6 4, Lecture Hall II**

The BCS-BEC crossover is the evolution of a superconductor, or a fermionic superfluid, when the strength of the effective inter-particle attraction is varied from weak to strong. For weak attraction, strongly-overlapping Cooper pairs form and condense below the critical temperature according to BCS theory. For strong attraction, tightly-bound molecules form, which may undergo the usual Bose-Einstein condensation at sufficiently low temperature. The question is if these quite different physical regimes can be unified as two limiting situations (BCS and BEC) of a single unifying theory. After some pioneering works, essentially driven by intellectual curiosity, the interest in the BCS–BEC crossover grew up with the advent of high-temperature (cuprate) superconductors, in which the size of the pairs appears to be comparable to the inter-particle spacing and are thus expected to be in an intermediate regime of the BCS-BEC crossover. A real explosion of this activity has appeared over the last fifteen years, with the experimental realization and exploration of the BCS–BEC crossover with ultra-cold Fermi gases. This colloquium will give an introduction to the BCS-BEC crossover and its key concepts, and a more detailed discussion of some of its aspects actively investigated by the Quantum Gases theory group in Camerino.

Giovanna Morigi (57472) and Pavel Bushev (2450) take care of the guest.

Interested people are cordially invited

Coffee at 4:00 p.m. in front of the Lecture Hall