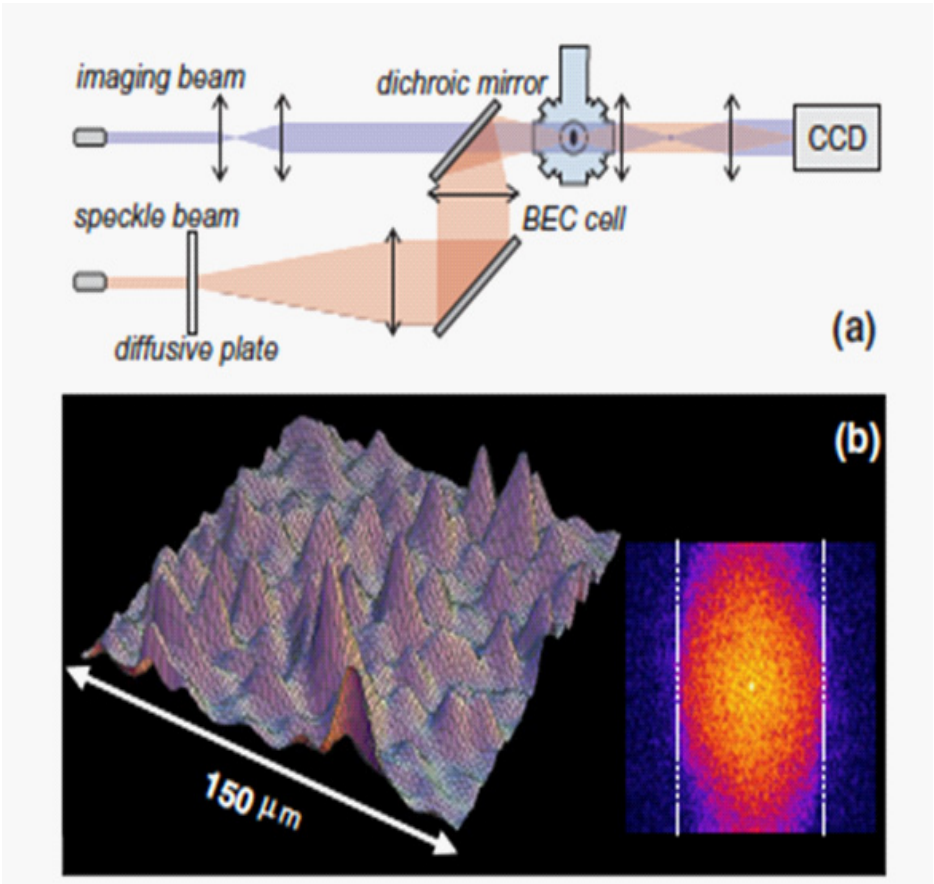
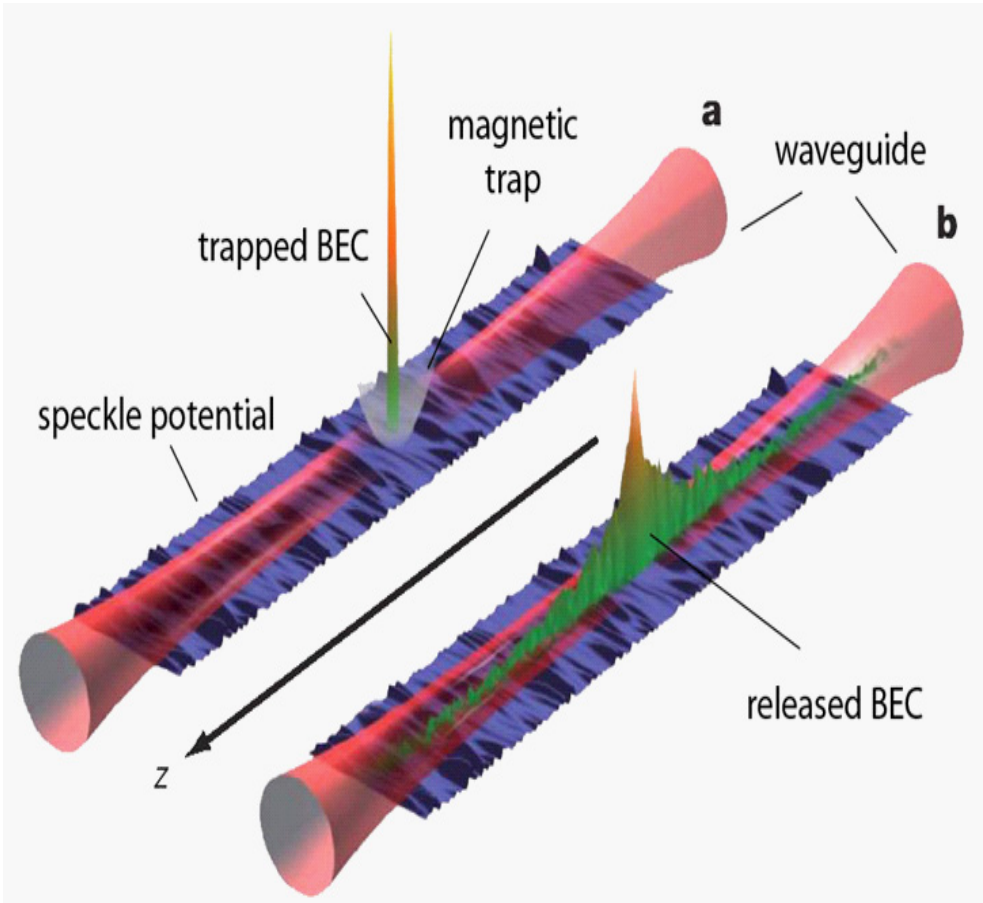
Boston University Physics Colloquium





Interaction induced delocalization in Bose gas

Anderson localization of a particle in a disordered medium is a basic quantum phenomenon. Abrahams et al. argued that a quantum particle is localized at any energy in 1 and 2 dimensions and at energies below some threshold value in 3 d. However, their arguments relate to a single particle or an ideal quantum gas. How the interaction changes the properties of a many-body system? In this talk the interaction-localization competition will be considered mainly for weakly interacting Bose gas in a random environment. Deeply localized states (the so-called Lifshitz tails) are filled by interacting particles up to some energy level. The filling grows with the number of particles growing until they became delocalized. Simultaneously the global coherence is established leading to superfluidity. Recently this idea was applied for explanation of the phase diagram near the superconductor-insulator transition. We discuss recent experiments with cooled atomic gases in the random field of speckles and in quasiperiodic potentials and experiments on superconductor-insulator transition.

Valery Pokrovsky

Texas A&M University

February 15, 2011 (Tuesday) at 3:30pm (Refreshments at 3:15pm)

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