Laboratoire National des Champs Magnétiques Intenses

Cycle de séminaires du LNCMI-T 2012-2013

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Rydberg atoms are atoms excited to high-lying quantum states; because the Rydberg electron is so far from the core of the atom, their properties are thus exaggerated with respect to ground-state neutral atoms. In particular Rydberg atoms are highly polarizable, leading to strong, tunable dipole interactions among the atoms, which have applications in many different fields of physics. One of the most important consequences of the strong interactions between Rydberg atoms is the Rydberg excitation blockade. When one atom is excited in a Rydberg state, the dipole interaction shifts the resonance and prevent the laser excitation of the neighboring atoms. In this talk experimental investigations about the probability of Rydberg excitation are discussed, including the full counting statistics of Rydberg excited gases in strongly interacting regimes. Experiments are performed using a small cloud of 87Rb atoms trapped in a Magneto Optical Trap (MOT); atoms are excited by means of a two photon process, while detection of Rydberg atoms is obtained by field ionization and collection of charges by a channel electron multiplier (CEM).