SFB/TRR 21 - Seminar

9. Oktober 2012, Stuttgart

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Spatial distributions in a cold strontium Rydberg gas

Long-range interactions between Rydberg atoms in cold atom ensembles lead to spatial correlations that are not present in the ground state distribution. We aim to study these correlations using a scanning autoionizing microscopy technique. We excite a cloud of strontium atoms cooled to 5 mK to a Rydberg state via a resonant two-photon transition using narrowband CW lasers. Working with Sr means there is a second valence electron with a transition at an accessible optical wavelength. Excitation of this electron leads to autoionization of the atom. By translating a tightly focused autoionization laser across the cold Rydberg ensemble we have created a technique to measure the spatial distribution of the Rydberg atoms. This technique also allows us to count individual ions and investigate the statistical distributions. This talk will detail measurements of the 2D Rydberg state spatial distribution with associated statistics using this autoionizing microscopy technique.

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