

Hot Rydberg atoms

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Rydberg atoms can also be studied in room temperature gases in versatile vapour cells and settings. By making use of state of the art glass machining, lithography, electronics and integrated photonic structures it is possible to create small and integrated quantum devices. Applications range from electric field sensors, THz-imaging, trace gas sensors, nonlinear optics to quantum optical devices. Latter is made possible by the interaction strength between Rydberg states, which even survive at room temperature and we have demonstrated recently a single photon source based on this. But there are also many fundamental questions to be asked before one can build a device. How do Rydberg atoms interact with close-by walls of the vapour cell, what are the limitations of integration, what role play ions produced in collisions, can we use also other gases than alkali vapours, etc.?

In my lecture I will give an introduction to the spectroscopy of room temperature gases, the engineering of complex vapour cells, the different regimes of Rydberg spectroscopy (cw, pulsed) and the possible applications hot Rydberg atoms.