

Abstract Submitted
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Towards a deterministic single-photon source by Rydberg FWM effect in a thermal microcell¹ YI-HSIN CHEN, FABIAN RIPKA, ROBERT LÖW, TILMAN PFAU, 5th Institute of Physics, Universität Stuttgart — The generation and manipulation of single photons are the key ingredients for the photonic-based quantum security communication and information processing. One promising candidate to realize the on-demand single-photon source is based on the combination of four-wave-mixing (FWM) and Rydberg blockade effects in a micrometer scale thermal microcell [1]. Similar to our past studies of coherent Rydberg dynamics [2] and van-der Waals interaction [3] in a three-level system, we implement a pulsed FWM scheme to observe both coherent dynamics and effects of dephasing due to Rydberg-Rydberg interaction [4]. Furthermore, we investigate the effects of the excitation volume by use of low- and high- NA optics and spatial confinement. We discuss prospects for the generation of non-classical light.

[1] M. M. Müller et al., PRA 87, 053412 (2013)

[2] Huber et al., PRL 107, 243001 (2011)

[3] Baluktsian et al., PRL 110, 123001 (2013)

[4] Huber et al., PRA 90, 053806 (2014)

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