SFB/TRR 21 - Seminar

20. August 2012, Stuttgart

Daniel Kolbe
(Johannes Gutenberg-Universität Mainz)

Coherent continuous-wave vacuum ultraviolet light by four-wave mixing in mercury

Vacuum ultraviolet radiation in the region of the Lyman-alpha transition in hydrogen (1s-2p at 122 nm) has many interesting applications. One is direct laser-cooling of anti-hydrogen, an essential step towards high precision spectroscopy. Comparing the 1s-2s transition energy with ordinary hydrogen promises a precise test of the CPT symmetry. Another one is the excitation of trapped calcium ions to Rydberg states, which establishes fast quantum gate operations without excitation of motional modes of the trap. Continuous-wave Lyman-alpha radiation can be generated by sum-frequency mixing of three light fields in a nonlinear medium (four-wave mixing). In this talk the influence of resonances of the nonlinear medium (mercury vapour) on the four-wave mixing process is discussed. Beneath a two-photon resonance we use two individual one-photon resonances which enhances the mixing efficiency up to three orders of magnitude. In addition the current status of the calcium-Rydberg project will be presented.

20. August 2012, 13:00 Uhr

Universität Stuttgart, NWZII, Raum 3.123
Pfaffenwaldring 57, 70569 Stuttgart

CO.CO.MAT