SFB/TRR 21 - Seminar
2. Februar 2011, Stuttgart

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Dipolar Interaction of Stationary-Light Dark-state Polaritons in Rydberg vapors

We put forward and discuss in detail a scheme to achieve Bose-Einstein condensation of stationary-light dark-state polaritons with dipolar interaction. We extend the works on Bose-Einstein condensation of photons and polaritonic quasiparticles, to the regime of dipolar quantum gases. To this end we introduce a diamond-like coupling scheme in a vapor of Rydberg atoms under the frozen gas approximation. To determine the system's dynamics we employe normal modes and identify the dark-state polariton corresponding to one of the modes. We show that in contrast to atomic dipolar ultra-cold vapors the dark-state polariton Bose-Einstein condensate can be repulsive in 3D.

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