



## Nir Kampel

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### Light assisted collisions in BEC and first steps towards Raman memory in a dense sample

The talk will be divided to 2 subjects:

1) How do light assisted collisions in a BEC effect the onset of Rayleigh superradiance? Can one produce resonant light inside a condensate? The onset of superradiant Rayleigh scattering serves as a sensitive monitor for matter wave coherence. A subtle interplay of binary and collective effects leads to a profound asymmetry between the two sides of the atomicresonance. We present a simplified quantitative model containing the essential physics to explain our experimental data and point at a new experimental route to study strongly coupled light matter systems.

2) First steps towards implementation of a quantum memory using a high optical depth sample. Here we use high optical depth samples (OD more than 1000), either BEC or just above the critical temperature. In this part of the talk we will cover our detection methods to investigate the light-atom interaction, namely specially resolved and heterodyne detection. We have used these detection methods to measure: Special resolved Faraday rotation and see that too high optical depth is not good for quantum information. Time resolved Rabi oscillation in a single pass experiment (seeing the effect on the photons). First experiments using the Raman memory configuration.

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