Title: Spectral response of magnetically trapped Bose-gases to weak radiofrequency/microwave fields

Abstract: Radiofrequency and microwave fields driving atomic spin- and hyperfine transitions are commonly used for extracting ultra-cold atoms from magnetic traps. On the one hand coherent atomlaser beams are extracted from Bose-Einstein condensates by applying weak radiofrequency and microwave radiation, on the other hand magnetic field noise can be measured through atom loss form magnetic traps. It has been proposed that the dynamics of magnetized cantilevers or current driven beams can be detected through their magnetic coupling to atomic spins and recording the spin dynamics.

For modeling and analysis of such systems, the knowledge of the spectral response of the magnetically trapped gas to radiofrequency-/microwave fields is necessary. Here we elaborate the model of the spectral response of thermal and condensed Bose-gases in the presence of gravity and measure it using a spin-sensitive single atom detector. We record the output of single- and multimode atomlasers and show that the power spectral density and the intensity correlations of the microwave field, which is used for out-coupling atoms from a Bose-Einstein condensate, can be reconstructed.