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Dynamics and response functions of an impurity in a BEC YULIA SHCHADILOVA, FABIAN GRUSDT, Harvard University, RICHARD SCHMIDT, ITAMP/Harvard University, EUGENE DEMLER, Harvard University — We discuss the non-equilibrium quantum dynamics of an impurity in an ultracold Bose gas. In our theoretical description we take into account the microscopic interactions beyond the Frhlich approximation. We calculate the response functions of the system for weak and strong RF-driving between two hyperfine states of the impurity. We show that in the weak driving regime the population transfer of the impurity is in agreement with spectral functions obtained by the linear response calculations. This is in contrast with the strong RF regime where we observe the strong renormalization of the Rabi frequency close to the inter-species Feshbach resonance.

Yulia Shchadilova
Harvard University

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