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Coherence on Förster resonances between Rydberg atoms ROBERT LOEW, ALEXANDER KRUPP, JOHANNES NIPPER, JONATHAN BALEWSKI, TILMAN PFAU, University of Stuttgart — Förster resonances are non-radiative dipole-dipole interactions between oscillating dipoles. Especially in biochemistry these resonances play a crucial role and describe the energy transfer process in many systems. In our work these resonances occur between pairs of Rydberg atoms, creating strong interactions between the atoms. We report on studies of Förster resonances between Rydberg atoms in an ultra-cold atomic cloud of 87Rb. By applying a small electric field we tune dipole coupled pair states into resonance, giving rise to Förster resonances. Via a Ramsey-type atom interferometer we can resolve several resonances at distinct electric field strengths. We study the coherence of the system at and close to the resonances and we observe a change in phase and visibility of the Ramsey fringes on resonance. The individual resonances are expected to exhibit different angular dependencies, opening the possibility to tune not only the interaction strength but also the angular dependence of the pair state potentials by an external electric field. Nipper et. al. Phys. Rev. Lett. 108, 113001 (2012) Nipper et. al. Phys. Rev. X 2, 031011 (2012);

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