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Coherent manipulation by adiabatic passage of interacting Rydberg atoms inside a cavity SANTOSH KUMAR, CHARLES EWEL, JONATHON SEDLACEK, JAMES SHAFFER, University of Oklahoma, UNIVERSITY OF OKLAHOMA TEAM — We investigate the coherent manipulation of interacting Rydberg atoms placed inside a cavity by using stimulated Raman adiabatic passage (STIRAP). In this approach, we consider a five-level double-ladder scheme with one common Rydberg level for N interacting atoms. One side of the ladder excites the atoms into the Rydberg level using counter-intuitive STIRAP pulses, while the other side of the ladder couples the atom to a cavity field. Due to the strong interaction between the atoms in the Rydberg level, the Rydberg blockade mechanism plays an important role in the manipulation of the atoms. We use numerical simulation to show that how one can generate non-classical states of light with this system. We consider how the decay mechanisms affect this interacting many-body system.

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