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Enhanced absorption and Autler-Townes splitting of electromagnetically induced transparency MATTHEW SIMONS, CHRISTOPHER HOLLOWAY, JOSHUA GORDON, NIST - Boulder, DAVID ANDERSON, STEPHANIE MILLER, ANDREW SCHWARZKOPF, NITHIWADEE THAICHAROEN, GEORG RAITHEL, University of Michigan, Dept. of Physics
— We study the dependence of the Autler-Townes splitting of electromagnetically induced transparency (EIT) in ^{85}Rb from an applied RF electric field on pump and probe laser power. The probe is tuned to the $5S_{1/2} \rightarrow 5P_{3/2}$ transition, and the pump is tuned to a $5P_{3/2} \rightarrow$ Rydberg transition to set up EIT in the probe transmission. The applied RF field is resonant with a neighboring Rydberg state transition, causing frequency splitting of the EIT signal. The splitting is proportional to the magnitude of the RF field, which is the basis for Rydberg atom EIT-based RF field probes. Increased laser power tends to broaden the transitions and low laser power reduces the overall signal. However, low probe laser power can allow enhanced absorption of the probe. This enhanced absorption can increase the ability to detect weak RF fields by improving the visibility of the EIT signal. This has applications to improving the sensitivity of Rydberg atom EIT-based RF field probes.

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