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Microwave-induced two-photon Autler-Townes splitting in Rydberg EIT STEPHANIE MILLER, DAVID ANDERSON, ANDREW SCHWARZKOPF, NITHIWADEE THAICHAROEN, University of Michigan, CHRISTOPHER HOLLOWAY, JOSHUA GORDON, National Institute of Standards and Technology (NIST) - Boulder, GEORG RAITHEL, University of Michigan — We study one- and two-photon microwave transitions between ^{85}Rb Rydberg states using electromagnetically induced transparency (EIT) in a Rb vapor cell. We generate a narrow EIT transparency window for a weak probe laser tuned to the $5S_{1/2} \rightarrow 5P_{3/2}$ transition using a strong coupling laser that is resonant with a $5P_{3/2} \rightarrow$ Rydberg transition. In addition, the optically driven Rydberg level is coupled to a neighboring one with microwaves. The Rydberg-Rydberg state coupling manifests in an Autler-Townes splitting of the EIT resonance, which is used to measure Rabi frequencies and field strengths. We investigate Autler-Townes splitting on the one-photon $62S_{1/2} - 62P_{3/2}$ transition, as well as on the $62S_{1/2} - 63S_{1/2}$ and the $62D_{5/2} - 63D_{5/2}$ two-photon transitions. Our results suggest this method could find applications in precision field-strength measurements of high-power microwave and THz radiation sources.

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