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Cavity-EIT with single atoms MARTIN MÜCKE, EDEN FIGUEROA, JOERG BOCHMANN, CAROLIN HAHN, CELSO JORGE VILLAS-BOAS, STEPHAN RITTER, GERHARD REMPE, Max-Planck-Institute for Quantum Optics, Hans-Kopfermann-Str. 1, 85748 Garching, Germany — Coherent dark states, such as electromagnetically induced transparency (EIT), can be used to control nonlinear effects for light fields. So far, these phenomena have been studied in media involving a macroscopic number of atoms. In order to scale down these systems to the single quantum level of matter (single atoms) and light (single photons) one has to enhance the matter-light interaction. We report on a new experiment where we use a high finesse optical cavity in which an exactly defined number of atoms can be coupled to the mode of the cavity. We discuss prospects for cavity-based EIT with single atoms and will present its first experimental observation.

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