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Photon blockade with a four-level atom coupled to a microcavity MICHAL BAJCSY, ARKA MAJUMDAR, JELENA VUČKOVIĆ, Ginzton Laboratory, Stanford University — We study the photon blockade phenomenon in a cavity containing a single four-level atom, starting with an idealized spacing of the energy levels in such atom. We show that while photon blockade in a cavity containing a two-level atom requires strong coupling between the atom and the cavity, the blockade becomes observable even in the absence of strong coupling when a fourlevel atom is used. The four-level atom outperforms the two-level atom also in the strongly coupled regime, as well as in the case when the spacing of the energy levels in the four-level atom becomes non-ideal. Finally, we show that with the mode volume and quality factors currently available in semiconductor optical microcavities, photon blockade should be achievable with alkali atoms coupled to such cavities.

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