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【414】Dissipation-engineered family of nearly dark states in many-body cavity-atom systems

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Three-level atomic systems coupled to light have the capacity to host dark states. We study a system of V-shaped three-level atoms coherently coupled to the two quadratures of a dissipative cavity. The interplay between the atomic level structure and dissipation makes the phase diagram of the open system drastically different from the closed one. It leads to the stabilization of a continuous family of dark and nearly dark excited many-body states with inverted atomic populations as the steady states. The multistability of these states can be probed via their distinct fluctuations, excitation spectra, and Liouvillian dynamics which are highly sensitive to ramp protocols.

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