Cavity-induced collective dissipation for cold chemistry

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Strong light-matter interactions are playing an increasingly crucial role in the understanding and engineering of new states of matter with relevance to the fields of quantum optics, solid state physics and materials science. In this talk we discuss the opportunity to combine cavity quantum electrodynamics and cold chemistry, by utilizing an optical cavity to form ground-state molecules from ultracold atoms. We propose theoretically that collective effects in the dissipative dynamics can provide a robust alternative to current techniques, such as photoassociation or STIRAP-based techniques. We conclude with a perspective of possible applications of cavity-QED in cold chemistry and materials science.