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Continuous-wave exciton-polariton lasing in cesium lead bromide perovskite microcrystal cavities[1] TYLER EVANS, Columbia Univ, ANDREW SCHLAUS, Columbia University, YONGPING FU, University of Wisconsin-Madison, XINJUE ZHONG, TIMOTHY ATALLAH, LOUIS BRUS, Columbia University, SONG JIN, University of Wisconsin-Madison, XIAOYANG ZHU, Columbia University — Lead halide perovskite microcrystals (MCs) have been demonstrated in pulsed lasing with high quantum yields, low thresholds, and broad wavelength tunability. However, continuous-wave (CW) lasing, which is essential to a wide range of applications, has not been possible to date. This is due to the difficulty in achieving a steady-state population inversion without catastrophic thermal damage. Here we demonstrate coherent light emission from polariton condensates formed in perovskite MC cavities under CW conditions. Analysis of the nonlinear polariton dispersion reveals exceptionally strong light-matter interaction characterized by a vacuum Rabi splitting of 0.200.02 eV. These findings suggest that lead halide perovskite MCs may serve as low-power coherent light sources and as model systems for polaritonics. They also provide insight into the nature of excitations in lead halide perovskites for solar energy conversion.

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