

Magneto-Optics of Anisotropic Exciton Polaritons in Two-Dimensional Perovskites

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Abstract

Layered 2D organic-inorganic perovskite semiconductors support strongly confined excitons that offer significant potential for ultrathin polaritonic devices due to their tunability and huge oscillator strength. The application of a magnetic field has proven to be an invaluable tool for investigating the exciton fine structure observed in these materials. Yet, the combination of an in-plane magnetic field and the strong coupling regime has remained largely unexplored. In this work, we combine microscopic theory with a rigorous solution of Maxwell's equations to model the magneto-optics of exciton polaritons in 2D perovskites.

We predict that the brightened dark exciton state can enter the strong coupling regime. Furthermore, the magnetic-field-induced mixing of polarization selection rules and the breaking of in-plane symmetry lead to highly anisotropic polariton branches. This study contributes to a better understanding of the exciton fine structure in 2D perovskites and demonstrates the cavity control of anisotropic and polarization-sensitive exciton polaritons.