Sympathetic Mechanism for Vibrational Condensation Enabled by Polariton Optomechanical Interaction

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We demonstrate a macrocoherent regime in exciton-polariton systems, where nonequilibrium polariton Bose-Einstein condensation coexists with macroscopically occupied vibrational states [1]. Strong exciton-vibration coupling induces an effective optomechanical interaction between cavity polaritons and vibrational degrees of freedom of molecules, leading to vibrational amplification in a resonant blue-detuned configuration [2]. This interaction provides a sympathetic mechanism to achieve vibrational condensation with potential applications in cavity-controlled chemistry, nonlinear, and quantum optics.

References

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