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Exciton-polariton condensation in transition metal dichalcogenide bilayer heterostructure[1] KI HOON LEE, JAE-SEUNG JEONG, HONGKI MIN, SUK BUM CHUNG, Seoul Natl Univ — For the bilayer heterostructure system in an optical microcavity, the interplay of the Coulomb interaction and the electron-photon coupling can lead to the emergence of quasiparticles consisting of the spatially indirect exciton and cavity photons known as *dipolariton*, which can form the Bose-Einstein condensate above a threshold density. Additional physics comes into play when each layer of the bilayer system consists of the transition metal dichalcogenide (TMD) monolayer. The TMD monolayer band structure in the low energy spectrum has two valley components with nontrivial Berry phase, which gives rise to a selection rule in the exciton-polariton coupling, e.g. the exciton from one (the other) valley can couple only to the clockwise (counter-clockwise) polarized photon. We investigate possible condensate phases of exciton-polariton in the bilayer TMD microcavity changing relevant parameters such as detuning, excitation density and interlayer distance.

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