Abstract Submitted
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Light-matter interactions of monolayer semiconductors integrated with photonic microcavities[1] Y.-J. CHEN, T. STANEV, G. WEI, N. P. STERN, Department of Physics and Astronomy, Northwestern University, J. D. CAIN, V. DRAVID, Materials Science and Engineering, Northwestern University — Enhanced light-matter interactions in optical microcavities can enable hybrid photon-exciton quasiparticle excitations when in a regime of strong light-matter coupling. Because of their direct bandgap, atomic-scale thickness, and strong spin-orbit coupling, monolayers of transition metal dichalcogenides (TMDs) allow for exciton-polaritons in a two-dimensional regime with rich correlations between spin, momentum, and light polarization. We demonstrate integrated TMD photonic devices with MoS_2 grown by vapor transport and sandwiched between dielectric Bragg mirrors. We discuss evidence for exciton-polaritons in monolayer TMDs at room temperature using angle-resolved cavity reflectivity spectroscopy. This interpretation is supported by the dependence on MoS_2 layer number. Calculations of light-matter coupling parameters in TMDs yield values consistent with recent observations [2]. We discuss our approach to integrated 2D monolayer photonics in the context of the valley-sensitive bandstructure of excitons in TMDs.

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[2]X. Liu, *et al.* *arXiv*:1406.4826, (2014)

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