Title: Spatial coherence of interlayer excitons in 2D semiconductor heterostructures

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Abstract:

MoSe2-WSe2 semiconductor heterostructures host long lived interlayer excitons (IXs) that emit light in the near infrared. The IXs in such heterostructures are composite bosons which, with the introduction of a bilayer h-BN separator, exhibit long range exciton flow. Numerous theoretical works have predicted these IXs can form a superfluid at low temperatures, motivating spatial coherence measurements. We performed optical coherence measurements on interlayer excitons in an h-BN separated MoSe2-WSe2 heterostructure. Specifically, we measured the spatial dependence of the degree of coherence present in the light emitted by IXs and observed long range (several micron) spatial coherence. The spatial coherence length of the MoSe2-hBN-WSe2 IXs is compared to a direct contact MoSe2-WSe2 device, showing qualitatively different spatial structure.