

Optical spectra of moiré exciton-polaritons: The role of Markovian vs. non-Markovian electron-phonon scattering

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Abstract

We study the role of Markovian and non-Markovian electron-phonon scattering for the line shape of optical absorption spectra of moiré exciton polaritons in TMDC bilayers. We find that for small twist angles associated with localized excitons and not too low temperatures non-Markovian features are quite pronounced, while for larger twist angles corresponding to delocalized excitons they are of minor importance. In particular, for small twist angles we find pronounced phonon sidebands between the two main polariton peaks which are absent at larger angles. Interestingly, there is a rather sharp transition at a twist angle of about 3.5° , which can be traced back to resonant phonon transitions to van Hove singularities in the polariton density of states.