

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magneto-optical properties of hybrid organic-inorganic perovskites ZHI-GANG YU, Washington State University — In semiconductors the k.p Hamiltonian played a central role in understanding material properties because the model parameters are directly related to experimental measurable properties. Here we construct a 8-band k.p Hamiltonian for tetragonal perovskites from both perturbation and group theories and determine the parameters from first-principles band-structure calculations and experiments. This Hamiltonian is then used to study conduction- and valence-band states as well as excitons under an arbitrary magnetic field. The calculated electron and hole g-factors can explain the exciton g-factors measured by magneto-absorption and magneto-luminescence and the field-dependent exciton energies are consistent with the high-field magneto-absorption experiment, which has been used to accurately determine the exciton binding energy.

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Date submitted: 05 Nov 2015

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