

Abstract Submitted
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Energy splitting of excitons in gapped Dirac materials¹ DI XIAO, JIANHUI ZHOU, WENYU SHAN, Carnegie Mellon Univ, WANG YAO, Univ. of Hong Kong, SATOSHI OKAMOTO, Oak Ridge National Laboratory — We show that there is an energy splitting between excitons with opposite angular momentum in gapped Dirac materials, such as monolayers of transition metal dichalcogenides and gapped surface states of topological insulators. This splitting can be traced back to the chiral nature of Dirac electrons. We also discuss the optical selection rule of excitons in gap Dirac materials and clarify the relationship to its single-particle counterpart. A simple estimation of the splitting (~ 10 meV) in monolayer transition metal dichalcogenides is given. Our result reveals the limitation of the venerable hydrogenic model of excitons, and highlights the importance of the Berry phase in

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