Gate voltage control of the Berry curvature in monolayer MoS₂

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For the monolayer MoS_2 , we calculate the Berry curvature, which generates the intrinsic spin/valley Hall effect in the material. By using $k \cdot p$ perturbation theory, we investigate the effect of mirror symmetry breaking in monolayer MoS_2 . Unlike the earlier calculation[1], it depends on the gate voltage, which breaks the mirror symmetry and induces the Rashba spin-momentum coupling. We find that the coupling enhances Berry curvature significantly. We calculate the spin/valley Hall conductivity from our result and it can explain recent experimental results.[2-4] Then we extend this analysis to bilayer MoS_2 .

References

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