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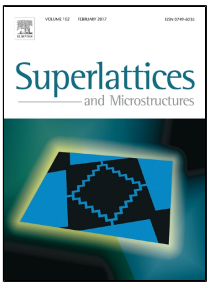

Electric-field tunable electronic structure in WSe_2/arsenene van der Waals heterostructure

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Highlights

· It is demonstrated that the WSe_2/arsenene heterobilayer is a type-II vdW heterostructure, and thus electrons and holes are spatially separated.

· The WSe_2/arsenene heterobilayer undergoes a transition from semiconductor to metal when subjected to an external electric field.

· The positive and negative external electric field have different effects on the band gap due to the spontaneous electric polarization in WSe_2/arsenene heterostructure.

· The WSe_2/arsenene vdW heterostructure experiences transitions from type-II to type-I and then from type-I to type-II under various external electric fields.

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