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Dependence of Condensate Formation in Graphene Bilayers on Relative Layer Orientation XUEHAO MOU¹, DIPANJAN BASU, LEONARD REGISTER, SANJAY BANERJEE, The University of Texas at Austin — It has been recently predicted that condensates can form between paired n-type and p-type graphene layers separated by a dielectric at room temperature under certain conditions. Recent works by the authors have explored the dependence of the condensate on dielectric thickness, dielectric constant, and charge densities including charge imbalance. However, to date only adjacent layers with the same crystal orientation have been modeled, such that the Dirac cones in each layer are precisely aligned with each other. In practice, obtaining such orientational alignment across a thin dielectric may be problematic. Therefore, the design of experiments to either prove or disprove the theory, and of devices to exploit this room temperature condensation should it exist, may depend critically on orientation dependence. In this work, we will theoretically consider the effects of crystal rotation on the existence and strength of the condensate using mean-field theory much as in the original works on the subject.

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