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Electronic structure of graphene-topological insulator heterostructures[1] CHRISTOPHER TRIOLA, JUNHUA ZHANG, ENRICO ROSSI, Department of Physics, College of William and Mary — We have studied the electronic structure of heterostructures consisting of graphene in close proximity to a strong three dimensional topological insulator (3DTI). We find that in the presence of a momentum dependent tunneling the low-energy band structure of graphene is qualitatively modified due to the hybridization of the two-dimensional bands of the 3DTI surface with the bands of graphene. One of the effects of the hybridization is to effectively shift the two spin-degenerate Dirac cones of pristine graphene in opposite directions in momentum space. We also show how, by tuning separately the doping in graphene and the 3DTI surface, some of the qualitative features of the hybridized bands can be controlled.

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