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Investigation of High Frequency Performance of Graphene field effect transistor Using a Self Consistent Transport Model ERCAG PINCE, COSKUN KOCABAS, Bilkent University, KOCABAS RESEARCH GROUP TEAM — Extremely high field effect mobility together with the high surface coverage makes graphene a promising material for high frequency electronics application. We investigate the intrinsic high frequency performance of graphene field effect transistors using a self consistent transport model. The self-consistent transport model is based on a nonuniversal diffusive transport that is governed by the charged impurity scattering owing to the presence of the charged impurities on the substrate. Experimentally feasible top gated transistor geometry is used for the calculations. The output and transfer characteristics of graphene field effect transistors are characterized as function of impurity concentration and dielectric constant of the gate insulator. Important high frequency device parameters such as transconductance, output resistance and power gain have been investigated. These results reveal the essential design considerations of the graphene transistors for radio frequency operations.

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