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Hydrodynamical model for charge transport in a graphene FET

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Thanks to its high mobility and conductivity, graphene is one of the new material candidate for the realization of new electronic devices. Recently [1] it has been proposed a model for a Graphene-FET (GFET) where the active area is a monolayer graphene sheet located between two strips of insulator (SiO_2) and the source and drain contact directly attached to it. The two up and down gate contacts are instead attached to the oxide.
In [1] the authors have shown that it is crucial to put the source and drain contacts along all the lateral edges for a better control of the electrostatic potential. In the direction orthogonal to the section the device is considered infinitely long. The description of the charge dynamic in the device is furnished by a drift diffusion set of equations coupled with a 2D Poisson equation.
Here we describe the charge transport in the same device by using a hydrodynamical model whose equations are derived from the semiclassical Boltzmann equation by means of the moment method and are closed by resorting to the maximum entropy principle [2]. The equations of the model form an hyperbolic system coupled with a Poisson equation and are solved with a suitable numerical scheme.

REFERENCES

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