MODELING OF FIELD EMISSION FROM GRAPHENE

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We report on modeling of electron field emission from an edge of a graphene layer. It is well-known that carbon nanotubes can serve as affective cold emitters[1]. That motivated us to make an attempt to study that effect in graphene.

It was shown [2] that strong electron – hole scattering dominates in graphene. For that reason we use a hydrodynamic model with self-consistent electric field for charge transport in a graphene layer [3]. The set of equations is added with proper boundary conditions. Tunneling current is used as a boundary condition for dynamic equations at the free edge of graphene. The simplified approach has been used for calculation of tunneling probability at that stage.

The problem has been treated numerically on the basis of the approaches developed in [4,5]. Emission current has been calculated, taking in account non-homogeneous charge distribution near the emitting edge of graphene.

That study may also pave an approach to the problem of field emission from a carbon nanotube, which is not quite solved yet.

References

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