## Electronic Transport in Two-dimensional Graphene with Structural Defects.

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Graphene, a single carbon plane arranged on a honeycomb lattice, has sparked out a lot of activities both from experimental and theoretical point of view in the last few years. The striking physical properties of this recent material are due to a peculiar electronic structure which yields notably to room temperature quantum hall effect, large coherence length and a high electronic mobility.

Graphene is expected to become a material of choice for future nanoelectronics. Nevertheless, this requires the capability to fine control the electronic and transport properties of this material.

Graphene is also an excellent platform to investigate the fundamental aspects of the localization phenomena. The existence of pseudospin is expected to induce weak antilocalization.

Parametrized on ab initio calculations, a tight-binding model for graphene with structural defects is used to study its transport properties with an order-N real-space Kubo-Greenwood formalism [1,2]. It is shown that a **large plateau of minimum of conductivity** is developed for 1% of Stone-Wales and divacancies defects (Fig.1). The structural defects are characterized by **strong resonant scattering** energies [3,4,5] which yield to an enhanced contribution of quantum interferences leading to strong localization effects. Rather short localization lengths suggest that Anderson localization should be observable in two dimensional irradiated graphene containing such structural defects.

## References

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## Figures



*Figure 1: Three structural defects in graphene:* (*a*) *Stone-Wales,* (*b*) *Divacancy 585, and* (*c*) *Divacancy 555-777*