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### **Graphene: Magic of Flat Carbon**

Graphene - a free-standing atomic plane of graphite - is a wonder material. It has many superlatives to its name. It is the thinnest material in the universe and the strongest one ever measured. Its charge carriers exhibit the highest intrinsic mobility, have zero effective mass and can travel micron distances without scattering at room temperature. Graphene can sustain current densities million times higher than that of copper, shows record thermal conductivity and stiffness, is impermeable to gases and reconciles such conflicting qualities as brittleness and ductility. Electron transport in graphene is described by a Dirac-like equation (rather than the standard Schrodinger equation), which allows the investigation of relativistic quantum phenomena in a bench-top experiment.

I will overview our work on graphene concentrating on its fascinating electronic and optical properties and speculate about future applications.