

Magneto-transport in large area epitaxial graphene grown on SiC:

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In this talk I will present magneto-transport measurements on epitaxial graphene grown on SiC(0001), either under UHV or atmospheric pressure. A low pressure growth results in low-mobility devices where both a localized state at low magnetic fields and a quantum Hall state at higher fields are observed. We find that for sufficiently strong disorder the system undergoes a direct transition from an insulating to a relativistic Hall conductor regime. Analysis of the magneto-conductivity hints to a quantum phase transition, rather than a simple crossover. For samples grown at atmospheric pressure we find high mobilities, up to 10.000 cm²/Vs, and we observe quantum Hall plateaus around filling factors $n=2,6,10,14$. Given the large sizes of our graphene Hall bars, the quantum Hall breakdown currents are large, which is promising for metrological applications. Finally, I will briefly discuss the case of multi-layer graphene grown on SiC(000-1).