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Hall effect in triangular antidot graphene under a weak magnetic field YUAN ZHENG, Department of Physics, HKUST, Clear Water Bay, Kowloon, Hong Kong, China — In triangular antidot graphene (TAG),a quasi-gap is formed by enhanced electron-electron interaction when the charge carrier density is very low, in conjunction with the appearance of a small effective mass for the TAG, owing to the altered dispersion relation. In the gap, a very long de-phasing length (10micron) has been observed at 2K. It means that there is an enlarged mesoscopic region in TAG. Within the quasigap, the inelastic scatterings are exponentially suppressed at low temperatures. Physics of electrons transport can therefore be treated with only elastic scatterings in the low temperature regime. Classical Hall effect is an effective way to probe the type of charge carriers and charge carrier density in semiconductor. When charge carrier density is low and the geometric size of the scattering features is also small, the Fermi wavelength of electrons can become comparable to the size of the scattering features. In the weak magnetic field regime, the giant Hall effect as well as the vanishing Vxy are both possible under certain conditions. In this talk we present both theoretical simulations and experimental results for the Hall effect in the antidot graphene.

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