



東京大学 G-COE プログラムー未来を拓く物理科学結集教育研究拠点ー
Global Center of Excellence for Physical Sciences Frontier

G-COE Seminar

Electron confinement in graphene quantum dots

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日時： 4pm, Monday, 13 July 2009

場所： 理学部 1 号館 9 階 933 号室

Abstract :

Graphene is different from any other semiconductor because its charge carriers are massless. They move at a constant speed and are unable to stop. But in contrast to natural massless particles, they can experience forces. This leads to some very unusual motion which is investigated both with quantum mechanics and classical mechanics. For example, graphene charge carriers approaching a one-dimensional potential barrier experience 100% transmission so one-dimensional confinement is impossible. In contrast, graphene charge carriers moving in two dimensions can be confined by a combination of electric and magnetic fields. The talk will be focussed on quantum states and particle trajectories in this situation. After an introduction to the physics of graphene, the physics of single electron confinement in graphene dots will be detailed and the prospects for experimental studies of this system will be discussed. In addition, molecular dynamics will be used to probe the physics of a few graphene charge carriers interacting in a dot. Finally, possible links to other areas of physics such as overcritical nuclei and Hawking radiation will be mentioned briefly.

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