東京大学大学院理学系研究科・理学部
物理学教室 談話会

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Suspended Nanocarbon Devices in Creation and Sensing of Condensed Matter States

2019 年 12 月 6 日（金） 午後 5 時 00 分～午後 6 時 30 分
東京大学理学部 4 号館 3 階 1320 号室

Graphene and carbon nanotube (CNT) mechanical resonators make ultra-sensitive sensors due to their small mass and nearly ideal structure. At low temperatures, high quality factors can be obtained, which facilitates detection of tiny frequency shifts as well as small variations in the resonance amplitude. The frequency shifts are caused by a modification in the resonator mass or in the spring constant, while the amplitude changes are due to altered dissipation.

I will review a few of our recent sensing experiments. For example, we have employed mechanical resonance frequency in a combined graphene-gold resonator mode to identify ordered states of two-dimensional electron gas in graphene: de Haas–van Alphen effect in the quantum Hall regime and magnetization of composite fermions have been investigated. The other examples to be discussed deal with charge detection sensitivity, interplay of superconducting phase and mechanical motion, detection of ultrasonic shear modes, and sub-monolayer ^{3}He films on carbon nanotubes.

※ 導入部は専門外、学生の方にもわかりやすくお話し頂く予定です。
※ 午後 4 時 30 分頃に 1320 号室にお茶とお菓子を用意していますので、
どうぞご利用下さい。