

# Seminar

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## Institute for Plasma Research

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**Title :** Nonlinear dynamics of atomically thin graphene oscillators

**Speaker:** Dr. Saikat Ghosh

Indian Institute of Technology, Kanpur

**Date :** 27th September 2019 (Friday)

**Time :** 3.30 PM.

**Venue :** Seminar Hall, IPR

**Abstract:**

Can an atomically thin oscillator push, pull and change dynamical response of another oscillator that is ten thousand times heavier than it? In this talk, we will argue in affirmative for such a scenario. In particular, we will discuss our recent experiments on a graphene membrane, strongly coupled to a large area, heavy, Silicon Nitride resonator. Firstly, we observe that small oscillations of the heavy oscillator is amplified to almost 4 orders of magnitude by graphene. With this motion amplifier, we detect a displacement of 3.8 femto-meter, integrated over a 1 second. Secondly, we observe a strong back-action force of the atomically thin oscillator on the heavy oscillator. The back action force changes the response of the heavy oscillator, making its response strongly nonlinear, with one of the highest recorded Duffing constant of  $10^{21}$  N/m<sup>3</sup>.

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