Nanoelectronics group

Variable temperature insert for 300mK and 14 T measurements

What do we do?

The goal of our work is to probe phenomena unique to nanoscale systems. We study:

-How electrons flow through one atom thick graphene

-How heat flows in wires 1000 times narrower than hair

-Why elastic properties of nanostructures are different

-How the spin of electron can be manipulated by its charge

Our work extensively uses the nanofabrication facility at TIFR.

How do we do it?

- Cutting edge nanofabrication
- Experiments at low temperatures
- Low noise measurements
- Use radio frequency electronics
- Make new electrical circuits
- Nanoscale optoelectronics

Why we do the things we do?

- To develop design of next generation transistors
- Explore how new sensors of charge, spin and mass can be made
- Understand how quantum Hall effect in graphene is different
- Use spin of electrons is coupled to its angular momentum

CURRENT MEMBERS:

Prof. Mandar M. Deshmukh,

PhD Students: John Mathew, Sameer Grover, Biswajit Datta

1/2 PhD position available

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Hari Solanki (Western Digital)

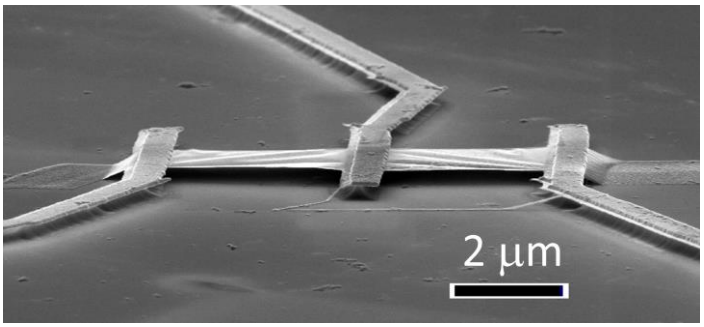
Vibhor Singh (Ass. Prof. IISc)

Sajal Dhara (Rochester U.)

Shamashis Sengupta (U. Paris Sud)

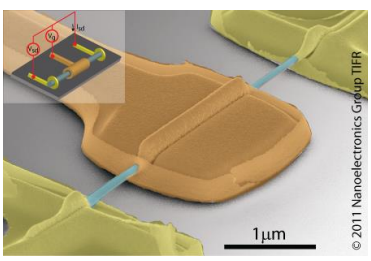
Sudipta Dubey (Grenoble)

Some of the key results from our lab



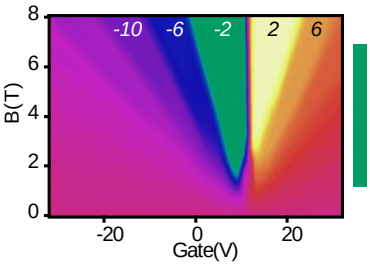
Single atom thick "guitar string" nanomechanical resonator

Used to show that graphene has a negative coefficient of expansion



Nanoscale transistor

An efficient wrap gate transistor



Quantum Hall effect in graphene

How stable is the quantum Hall state?