

Students' Annual Seminar

Controllably Grown Atomic Layers and Their Heterostructures for Devices

Rahul Sharma

Chemical vapor deposition assisted growth of atomic layers such as graphene, NbSe₂, MoS₂, MoSe₂, WS₂, and WSe₂ are optimized with number of layers' control and large area coverage. The growth of metal dichalcogenides (TMCs) having limited number of layers normally results to polygon shaped crystals, while a growth method is optimized to obtain dendrite like structures of TMCs too by controlling the growth kinetics. Another material optimized during the last one year is fluorographene (FG) ultra-films, where a catalyst free method is developed for their growth on various substrates. This includes their direct on semiconducting substrates such as silicates (Si/SiO₂ or borosilicate glass fiber), and such grown films are used for the development of other atomic layers (example: MoS₂) containing heterostructure devices. FG-MoS₂ based field effect transistor is devised and its working as a photodetector is studied. A detailed transport through the FG is also carried out. These results will be discussed during the talk and the plan for the near future research will also be discussed during the end of the talk.

References:

1. Vapour Transport Deposition of Fluorographene Oxide Films and Electro-Optical Device Applications, Rahul Sharma, Ravi K. Biroju, Ofer Sinai, Hagai Cohen, Krishna Rani Sahoo, Vlada Artel, Hadas Alon, Adi Levi, A. Subrahmanyam, Wolfgang Theis, Doron Naveh, and T. N. Narayanan, Applied Materials Today, 13, 387-395 (2018).

Friday, Feb 8th 2019

11:00 AM (Tea/Coffee at 10:15 AM)

Seminar Hall, TIFR-H