



Quantum nano-electronics in two-dimensional transition metal chalcogenides.

Project No: 2020-01-15



Two-dimensional transition metal chalcogenide (TMDCs) is one of the most promising material in recent times in the field of quantum device, optoelectronics and valleytronics applications. It has ability to form in semiconductor, metal, semi-metal state . It possesses certain special properties (Structural, Electronic , optoelectronic etc) in bulk and in low dimensions and these properties make this material more reliable even more than graphene. In our work, we focus mainly in group VI-B TMDCs and study it's relevant properties (mainly electronic) when it is made in 2-D. Then we will fabricate quantum electronic devices (Single electron transistor, gate as well as physically defined quantum dot/wire and study it's quantum confinement effect. After that we will try to develop quantum sensor based on this device. Finally, we will implement all this things in quantum limit and study quantum circuit, qubit etc.



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Role of this Project: Nano-electronic Device fabrication and Quantum sensors for quantum information technology ()



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Role of this project: Synthesis of 2D-TMDCs, XPS, Raman spectroscopy, Photoluminescence and cathodoluminescence study of 2D materials.



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