

Project Title: Development of Low Cost Spectrum Tunable Spectrum Selective Photodetectors

Principal Investigator: Dr. Yogesh Kumar (Assistant Professor Sr. Grade, ECE, IIIT-128)

Funding Agency: Science and Engineering Research Board (SERB)

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Approved Fund: 23.5 Lakh

Duration: 3 year (2022-25)

Lab Development:

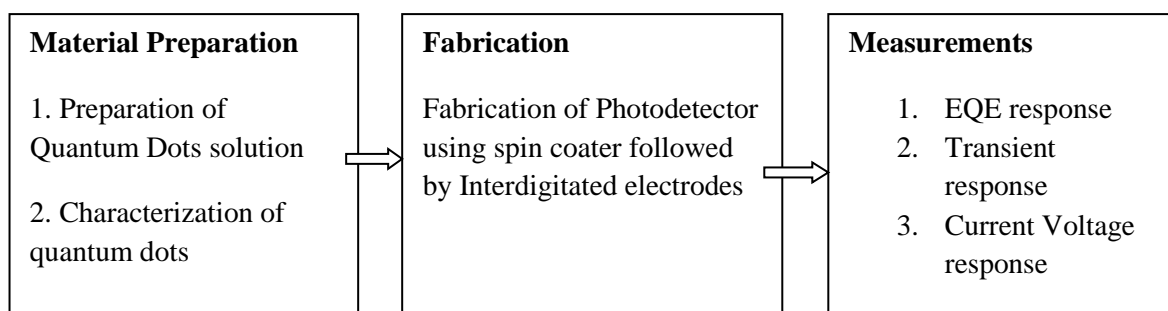
1. Chemical Lab at IIIT-128
2. External quantum efficiency (EQE) measurement setup for Photo detector and solar cell at IIIT-128

Project Idea:

Spectrum selective photodetectors are the class of detectors which are capable of detecting lights over a very narrow selected wavelengths. Such type of detectors have a narrow Gaussian pulse like responsivity versus wavelength characteristics. The spectrum selective photodetectors plays an important role for multiple applications such as imaging system (for night vision), missile detection, Ozone damage monitoring, mimicking human eye, and artificial intelligence [1]. For imaging systems, the spectral response window of the photodetector should be a narrowband in nature [2].

The objective of this project is to develop low cost solution processed tunable ultra- spectrum selectivity photodetector for UV and Visible range.

Project work flow:



Research Lab Development:

1. Tunable Light Source (18.5 L)

Reference:

[1] Y. Fang, Q. Dong, Y. Shao, Y. Yuan, and J. Huang, "Highly narrowband perovskite single-crystal photodetectors enabled by surface-charge recombination," *Nat. Photonics*, vol. 9, no. 10, pp. 679–686, 2015, doi: 10.1038/nphoton.2015.156.

[2] R. Jansen Van Vuuren et al., "Determining the absorption tolerance of single chromophore photodiodes for machine vision," *Appl. Phys. Lett.*, vol. 96, no. 25, pp. 1– 4, Jun. 2010, doi: 10.1063/1.3456374.

[3] H. Chen, K. Liu, L. Hu, A. A. Al-Ghamdi, and X. Fang, "New concept ultraviolet photodetectors," *Mater. Today*, vol. 18, no. 9, pp. 493–502, 2015, doi: 10.1016/j.mattod.2015.06.001.