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## **p-type black phosphorus based photodetector**

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Two-dimensional (2D) materials have become the promising channel materials for optoelectronic applications. In this regards, few layered Black Phosphorus (BP) has shown a significant potential, due to its ultrathin layered structure, high carrier mobility, mechanical flexibility and thickness dependent direct band gap ranging from 0.3 eV (bulk) –2.0 eV (monolayer). Herein, we will be presenting the latest results obtained on the fabricated device based on thin layer BP channel. The fabricated device exhibits p-type transport with high hole mobility at low Vds. The device shows a linear increase in photocurrent as a function of laser power and exposure duration. The results confirm high photoresponsivity from the device under white light illumination. Further, a long photocurrent decay time characteristic confirms the single type of traps dominating the process. The obtained results are significant and can be of interest to the researchers involved in the 2D materials for potential photodetector applications.

### **Recent publications**

1. Kumar, Arun & Mirshokraee, Seyed Ariana & Lamperti, Alessio & Cantoni, Matteo & Longo, Massimo & Wiemer, Claudia. (2022). Structural and Interface analysis of Ge-(Sb)-Te/Sb2Te3 core-shell

nanowires grown by MOCVD.

2. Longo, Emanuele & Locatelli, Lorenzo & belli, matteo & Kumar, Arun & Longo, Massimo & Fanciulli, Marco & Mantovan, R. (2021). Spin-Charge Conversion in Fe/Au/Sb2Te3 Heterostructures as Probed By Spin Pumping Ferromagnetic Resonance. *Advanced Materials Interfaces*. 2101244.
3. Giubileo, Filippo & Faella, Enver & Pelella, Aniello & Kumar, Arun & Capista, Daniele & Passacantando, Maurizio & Kim, Sang & Di Bartolomeo, Antonio. (2022). SnO2 Nanofibers Network for Cold Cathode Applications in Vacuum Nanoelectronics. *Advanced Electronic Materials*.

### **Biography**

Arun Kumar is a University Researcher (Asst. Prof.) at the Department of Physics 'E.R. Caianiello', University of Salerno, Italy, working on the development of low dimensional heterostructures for optoelectronics applications. His research interests are towards the development and fundamental understanding of semiconductor nanomaterials for the photodetectors, non-volatile memories, solar cells, sensors applications. He has published more than 27 publications in peer reviewed scientific journals and presented his scientific activities at various international conferences.

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