

Title 3: Development of Nanopatterned High-performance Solar-blind Photodetector Arrays for Space and Military Applications

Brief: In recent times, the solar-blind photodetectors (SBPDs) have attracted a focused research interest owing to their broad potential applications in the fields of solar observations, ultraviolet (UV) astronomy, military defense, automatization, short-range communications security, as well as environmental and biological researches. It is important to consider that these applications require the operation of photodetection systems in harsh environments. Currently, the solid-state photon detectors based on semiconductors other than silicon are not yet considered mature technology. Moreover, the commercially available wide bandgap semiconductor based photodiodes suffers drawbacks such as narrow range of sensitivity, requirement of expensive optical filters against the strong illumination by visible light etc. Therefore, the development of novel materials such as ZnO/MgZnO heterostructures based SBPDs can open up new possibilities in various domains. In view of the ZnO/MgZnO/BeZnO based solar-blind photodetectors (SBPDs) present to be reliable, cost-effective and eco-friendly solutions due to their inherent material properties in terms of low defect density, easy fabrication, and environmental friendly, we aim to

- Design and fabricate SBPDs based on heterostructure and multiple quantum well-based SBPDs.
- High crystalline quality epitaxial growth of materials to realize SBPD structure.
- Fabrication of SPBD array for commercial, space, and military applications.

Keyword: UV photodetector, Space applications, defence, solar-blind