# ABSTRACT

Light detection is fundamental in optics, with photodetectors playing a crucial role in converting light energy into electrical signals. These devices are pivotal in applications ranging from optical communication to imaging and biomedicine. This study explores the potential of photodetectors based on submicrometer particles of lysine and $WS_2$ (Tungsten Disulfide) as active materials. $WS_2$, a Transition Metal Dichalcogenide (TMDC), exhibits high charge carrier mobility, indirect and direct bandgaps, and strong sensitivity in the visible light spectrum, making it a compelling candidate for optoelectronic applications.

Lysine, an amino acid, shows UV-Vis sensitivity with a peak absorption at 201.5 nm, making it suitable for specific wavelength range applications. Both lysine and $WS_2$ present unique optoelectronic properties and are potential alternatives to traditional silicon-based photodetectors.

This research aims to design photodetectors with interchangeable active materials, emphasizing their sensitivity to UV-Vis light. The study explores the materials' electrical and optoelectronic characteristics, comparing them to silicon-based photodetectors. The objective is to develop photodetectors that surpass silicon's limitations, offering higher light detection efficiency and improved responsivity in the UV-Vis spectrum. These findings hold promise for enhancing photodetector performance across various applications, advancing the field of optoelectronics.

**Keywords - Lysine, Optoelectronic, Photodetector, UV-Vis sensitivity, $WS_2$ (Tungsten Disulfide)**