

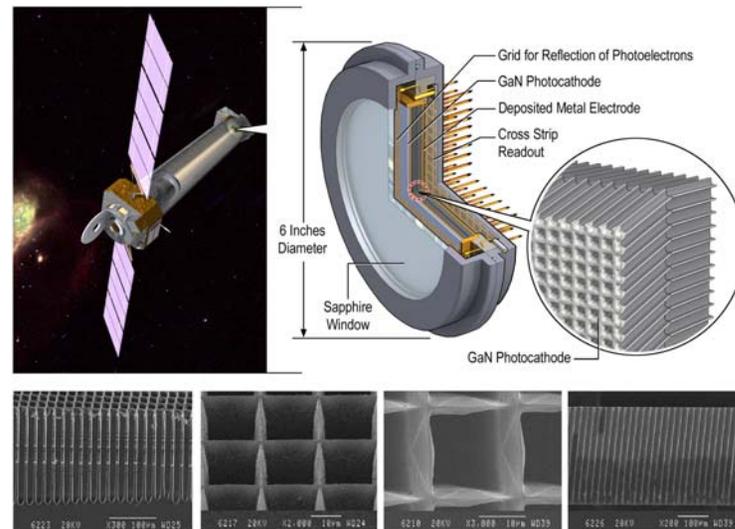
Large-Area Silicon Microchannel Plate UV Detector

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Proposal No: 07-S1.059739

Identification and Significance of Innovation

To address NASA needs for efficient photodetectors for new UV space instrumentation Physical Optics Corporation (POC) proposes to develop a new Silicon Microchannel-Plate-Based Large-Area UV detector (UV-Si-MCP) with the solar-blind, highly efficient, GaN photocathode fabricated directly on the surface of the microchannel plate. The photodetector will be fabricated on 6 in. silicon wafers and will have over 10^9 microchannels etched by POC proprietary technology. The photocathode will have quantum efficiency over 50% in the UV spectrum, with a sharp cutoff below the visible range. The improvement in photodetector efficiency and its large size will significantly reduce requirements for future space UV telescopes and other mission instrumentation without, sacrificing their performance parameters. At the end of Phase I the photodetector will be TRL-4 and TRL-6 will be achieved by the end of Phase II.



Technical Objectives

1. Development of a preliminary design of the proposed UV-Si-MCP photodetector and analysis to determine optimal parameters of the photodetector components.
2. Identification of technologies for implementing the UV-Si-MCP design.
3. Integration, testing, and evaluation of the UV-Si-MCP prototype.
4. Preliminary establishment of the commercial promise of the UV-Si-MCP devices and key technologies utilized for their fabrication.

Work Plan

1. Develop the UV-Si-MCP Architecture
2. Optimize ECANE Technology for Etching 6 in. Wafers
3. Fabricate Dynode Structure on Etched MCP Microchannels
4. Fabricate GaN Structure on the Front MCP Surface
5. Assemble UV-Si-MCP Prototype
6. Measure Spectral Response and Quantum Efficiency
7. Explore the Commercial Potential and Product Viability
8. Prepare and Submit Reports.

NASA Applications

UV telescopes and spectrometers for future missions within Explorers, Discovery, Origins, Beyond Einstein, and Vision Missions. Current and future missions which rely upon this technology include HST-STIS, GALEX, COS, EUVE, XMM-OM, CHIPS, and FAUST.

Non-NASA Applications

Missile plume detection, investigation of metabolism in organic cells by monitoring UV fluorescence, atmospheric research, and over the line-of-sight covert communication.

Contact

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