

Development of (V)UV-Sensitive GaN Geiger-Mode Photodiodes

Thursday, May 27, 2021 8:42 AM (18 minutes)

We present results from our ongoing development of Geiger-mode GaN-photodiodes. Motivated by the silicon photomultiplier's great success, our objective is to transfer the silicon-photomultiplier concept - a matrix of individually quenched single-photon avalanche diodes - to GaN and AlGaN. These are wide band-gap III-N semiconductors with much better intrinsic (V)UV sensitivity than silicon, making them interesting photon-detector materials, for example, to detect scintillation light from liquid Xe and Ar detectors.

The purity of III-N semiconductor substrates is now sufficiently high to envision single-photon sensitive photodiodes operating in Geiger mode. And indeed, we successfully fabricated GaN photodiodes and could demonstrate their Geiger-mode characteristics and single-photon sensitivity.

This presentation will discuss the electrical and optical characteristics of our GaN structures and their implications for developing a GaN solid-state photomultiplier.

TIPP2020 abstract resubmission?

Yes, this would have been presented at TIPP2020.

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