

# Studies of GaN avalanche diodes as a primary cell for a solid-state photomultiplier

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Silicon photomultipliers (SiPMs) are now widely used in high-energy physics. They are popular because of their small size, their capability to detect single-photons, their insensitivity to magnetic fields, and their low radioactivity. It is, however, challenging to achieve high photon detection efficiencies in the UV and VUV. A feature that is very much desired in liquid Argon and Xenon detectors. Achieving good UV sensitivity is an inherent problem with any silicon-based photon detector. Compound III-V semiconductors like GaN or AlGa<sub>N</sub>, on the other hand, exhibit good UV sensitivity. Also, their spectral response can be tuned to meet the needs of a specific application. Is it thus feasible to build a GaN or AlGa<sub>N</sub> photon detector that uses the SiPM concept?

To find out, we develop GaN and AlGa<sub>N</sub> photodiodes and test the electrical and optical characteristics of single cells operated in Geigermode. In this talk, I present our AlGa<sub>N</sub> structures and their characteristics.

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**Author:** Prof. OTTE, Nepomuk (Georgia Institute of Technology)

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