

Development of radiation-hard GaN devices for MIP detection - Phase I

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Gallium nitride (GaN) semiconductors are now commonly found in optoelectronic and high-power devices, e.g., light-emitting diodes (LEDs), lasers and high electron mobility transistors (HEMTs). GaN can also be used for detecting ionizing radiation under extreme radiation conditions due to its properties such as a wide bandgap (3.39 eV), large displacement energy (theoretical values averaging 109 eV for N and 45 eV for Ga), and high thermal stability (melting point: 2500C). Compared to narrower band-gap semiconductors such as silicon, GaN can operate at higher temperatures; while a comparison with other wide band-gap semiconductors, such as SiC, demonstrates GaN's higher electron mobility and potential for better carrier transport properties. In the proposal below, we provide the outline of a project that aims to exploit recent developments in GaN fabrication processes aiming at robust performances at harsh environments, e.g. high temperatures, and assess the potential of GaN as a material for the fabrication of radiation hard devices for MIP detection.

Type of presentation (in-person/online)

online presentation (zoom)

Type of presentation (scientific results or project proposal)

project proposal for future work

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