Contribution ID: **43** Type: **WG5 - Characterization techniques - facilities**

# Response of diamond radiation detectors operated at high electric fields

*Thursday, 13 November 2025 16:50 (20 minutes)*

Due to their inherent properties, Chemical Vapor Deposition (CVD) diamond detectors are often highly appealing solutions in the field of nuclear technology, in applications where radiation sensors are expected to provide reliable response in harsh conditions and under high fluences in mixed radiation environments. Moreover, today's technological challenges require the development of particle detectors with increased detection sensitivity to low ionization density radiation.

On the contrary, the radiation damage in diamond detectors is manifested primarily in the deterioration of the signal pulse height. Similarly, studies of diamonds response in low temperatures have revealed a significant reduction of their signal below 120 K, due to the formation of excitons. As such, the diamond detectors performance in the aforementioned challenges is often limited.

Even though diamond single crystal can withstand extremely high electric fields, investigations of the charge transport properties of such detectors under high electric field are scarce. In the present contribution we report on recent results of charge transport on scCVD diamond detectors, operated in electric fields, from 10 V/um up to several hundreds of V/um. Examples showing the enhancement of diamonds signal after radiation damage as well as in cryogenic temperatures, when operated in high fields, will be presented. In addition, charge multiplication and avalanche processes observed in the higher operation fields will be highlighted.

## Type of presentation (in-person/online)

in-person presentation

## Type of presentation (I. scientific results or II. project proposal)

I. Presentation on scientific results

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**Session Classification:** WG6/WP3 - Wide bandgap detectors