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Radiation hardness studies of Half-Activated-Boron LGADs

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HPK has produced LGADs where boron was not fully activated after the implantation. This was an attempt to reduce acceptor removal in the gain layer by formation of defect complexes of non-activated interstitial boron atoms with radiation induced interstitial silicon atoms and other impurities. In this was the replacement of activated boron by interstitial silicon in the lattice position would be mitigated. A set of such sensors with different fraction of activated boron was irradiated by reactor neutrons and studied with CV-IV and charge collection/timing measurements.

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