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Effects of irradiation on LGAD devices with high excess current

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Silicon n-p diodes with heavily doped p layer underneath the n implant were designed to benefit from charge multiplication process already before irradiation. The leakage current of the devices produced varies by few orders of magnitude. Its origin it is not clear yet, but it has an impact on the device performance after the irradiation. The excess holes trapped at the deep traps cause the changes in the space charge and consequently in multiplication. The devices were investigated after different type of irradiation: 200 MeV pions, 800 MeV protons and reactor neutrons.

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