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## Defect-engineering of new detector solutions

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CiS has started various projects to develop detectors for the detection of UV / DUV, X-ray, neutrons, low energy electrons, alpha and beta particles, prompt-gamma detection and Delta-E detectors.

This requires amongst others extremely flat pn junctions with sufficient sheet resistance even for larger areas and thinnest dead layers.

Technological methods, such as Plasma Immersion Ion Implantation PIII with BF<sub>3</sub> and B<sub>2</sub>H<sub>6</sub>, solid phase epitaxial regrowth SPER, co-implantation will be used and investigated.

These structures (for example low gain avalanche detectors (LGAD)) and technological process chains should be designed in such a way that the radiation hardness can be maintained or increased.

In particular the disappearance of the gain layer in LGAD structures due to irradiation must be circumvented by defectengineering approaches.

Various new or advanced approaches of defect engineering of silicon detectors will be investigated and the suitability of different analysis methods (eg low temperature photoluminescence (LTPL) and / or TEM, eddy current measurement and others) have to be evaluated.

Concept and ongoing work for LGAD and silicon diodes adjusted for detection of low energy electrons will be presented.

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