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Monolithic Array of Reach THrough Avalanche photo diodes - qualification of the first prototype production

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In order to achieve a pixel diode inherent signal amplification, Low Gain Avalanche Photo Diodes LGADs have come into focus of pixel detector developments. Our novel Concept for a Monolithic Array of Reach THrough Avalanche photo diodes, addresses one of the main issues of conventional LGADs, the inhomogeneity in the gap Region between pixels. The goal is to provides a 100\% fill factor and homogeneous gain over the complete sensor area. This is realized by an n-doped field drop layer between the n+ pixel structure and an unstructured p-doped multiplication layer. The field drop layer suppresses electric field peaks at the pixel edges and leads to a fairly homogeneous amplification over the sensor area. The functionality and first insights into the functionality of the MARTHA sensors have already been demonstrated. We are currently working on qualifying the homogeneity over the wafer area and further qualification of our prototype production.

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