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## **Development of Segmented LGAD with small pixels and high Fill-Factor**

Low Gain Avalanche Diodes (LGADs) have gained great interest in particle tracking and timing applications. Besides HEP detectors, LGADs have the potentiality of replacing standard silicon sensors in almost every application, with the added advantage of providing larger signals avoiding at the same time the additional noise affecting standard APDs.

Within Helmholtz DTS program and in synergy with Tangerine, a new generation of LGAD technology, based on based TI-LGAD (Trench Isolated LGAD), has been designed, fabricated tested and characterized at KIT.

In this contribution, an overview of the sensor technology with a deep focus on the layout design rules and the recent performances achieved are presented. The aforementioned layout design rules enable the unique opportunity to develop pixel and microstrip detectors with a spatial and time resolution  $< 20 \mu\text{m}$  and 20 ps, respectively.

Thanks to this work, the “DTS-2” milestone, which aims for the availability of sensors with high spatial (20  $\mu\text{m}$ ) and time resolution (20 ps) for charged particles and photon sciences, has been fully accomplished and the results will be reported in this contribution. Moreover, the accomplishment of the DTS-2 milestone aligns the Helmholtz research activities to the European detector roadmap.

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