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Deep Junction LGAD: a new approach to high granularity LGAD

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Low Gain Avalanche Detectors (LGADs) are silicon detectors with modest internal gain (up to ~ 50) that allows the sensor to be very thin (20-50 μm). LGADs are characterized by an extremely good time resolution (down to 17ps), a fast rise time ($\sim 500\text{ps}$) and a very high repetition rate ($\sim 1\text{ns}$ full charge collection). In a broad array of fields, including particle physics (4-D tracking) and photon science (X-ray imaging), LGADs are a promising R&D path. However, due to structures required to provide electrostatic isolation between LGAD pixels, the granularity of production-level devices is limited to the $1\times 1\text{ mm}^2$ scale. However applications in particle physics and photon science demand granularity scales of $100\times 100\text{ }\mu\text{m}^2$ or better. Several promising approaches to improve this current limitation of LGADs are currently in R&D status. In this talk, we'll present a completely new idea involving a buried gain layer to overcome the current granularity limit: the DJ-LGAD.

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