Contribution ID: **42**   Type: **not specified**

New Approaches to Fine Granularity Timing Detectors

Thursday, 18 March 2021 15:40 (20 minutes)

A collaboration involving a US National Laboratory (Brookhaven National Laboratory), a private-sector technology company (Cactus Materials, Inc.) and a University institute (the Santa Cruz Institute for Particle Physics at the University of California, Santa Cruz) has been working on new approaches to the development of highly-granular timing layers for minimum-ionizing particle and X-Ray detection. Progress has been made in the design and prototyping of the Deep Junction LGAD, a novel approach to the implementation of impact-ionization gain in silicon diode detectors that allows for the reduction of the granularity scale to below 100 microns, while maintaining DC coupling to the readout electrodes. Work is also progressing on high-density interconnect ("3D Integration") technology geared towards the enabling of commensurate high-density readout of granular systems. Progress in both of these areas will be presented.

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Session Classification: Solid State Vertexing and Tracking

Track Classification: Solid State