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Ultra-fast Detection System

Tech ID: 33184 / UC Case 2023-917-0

BACKGROUND

Detection of single ionizing particles at rates approaching the gigahertz (GHz) range per channel has potential for applications in medical imaging and treatment as well as particle and nuclear physics. Current ionizing particle detection systems detect with maximum frame rates of ~500 MHz. As accelerators (e.g. XFELs) are upgraded to deliver trains of pulses at faster rates, detection systems will need to keep pace. Methods and devices that can detect at GHz rates will be required to meet the demands of modern societal needs and equipment.

TECHNOLOGY DESCRIPTION

To help address this issue with a focus on signal path, investigators at UC Santa Cruz (UCSC) have developed new particle detector hardware that uniquely minimizes inductance and protects against signal-path resonances below 10 GHz. By taking advantage of RF-specific components, eliminating signal-path PCB traces, and employing an ultra-compact signal path, initial UCSC research results show promise in achieving readouts of 1 GHz and beyond.

APPLICATIONS

- ▶ Medical imaging
- ▶ Medical therapy e.g. radiotherapy
- ▶ Research tooling

ADVANTAGES

- ▶ ultra-fast signal response
- ▶ multi-channel for high bandwidth
- ▶ ultra-compact footprint

INTELLECTUAL PROPERTY INFORMATION

Patent Pending

RELATED MATERIALS

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OTHER INFORMATION

CATEGORIZED AS

- ▶ **Engineering**
 - ▶ Engineering
- ▶ **Semiconductors**
 - ▶ Assembly and Packaging
 - ▶ Design and Fabrication
- ▶ **Sensors & Instrumentation**
 - ▶ Medical
 - ▶ Process Control
 - ▶ Scientific/Research

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