

CMS HCAL Run II Communication Loss and VTRx Studies

Grace E. Cummings on behalf of the CMS Collaboration

CMS HCAL Phase I

The Problem

Towards Novel Wafer-Wafer Bonded Pixel Detectors

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Motivation

- Low temperature covalent bonding enables the fusion of different semiconductor technologies.
- Pixel detectors are the most sensitive and precise detectors for particle physics experiments.
- The current technology for pixel detectors is based on silicon and is limited by the properties of silicon.
- High Z absorbers are essential for the detection of high energy particles.
- The combination of a high Z absorber and a pixel detector allows for the detection of high energy particles with high precision.

Our Goals

- Enabling the development of the next generation of pixel detectors.
- Improving the performance of the current generation of pixel detectors.
- Reducing the cost of production.
- Enabling the production of large area detectors.

Comparison with Existing Detector Structures

Influence of the Covalent Bonding Interface

Low Temperature Covalent Wafer Bonding

Processing of Custom Test Structures

References

Contact Information

LOCO-ANS: An Optimized Efficient and Low-Cost

Thomas Klose, PhD, Department of High Performance Computing and Networking, University of Vienna

Motivation

- Current image sensors are not optimized for high performance and low cost.
- High performance image sensors are expensive and have a long lead time.
- Low cost image sensors are not optimized for high performance.

PPSU-LS (Low Cost)

- High performance and low cost image sensors.
- Optimized for high performance and low cost.
- High performance and low cost image sensors.

Performance comparison

Current Developments (Hardware Implications)

- Hardware implications in research system architecture.
- Performance implications in research system architecture.