

## Development of next-generation, no-gain Si photodiode array for HL-LHC

*Tuesday 5 December 2023 09:00 (20 minutes)*

Many of our sensors were installed in the previous LHC, and they contributed to the discovery of the Higgs boson. This HL-LHC upgrade required significant improvements from the previous product specification, such as one-digit-higher radiation hardness, suppression of increased dark current, and a substantial increase in the number of channels. To overcome these challenges, stealth dicing technology and a high-speed inspection system were introduced during the sensor production process. As a result, we succeeded in developing a new Si photodiode array (Si strip detector, Si pixel detector) for the HL-LHC. Production and delivery started in 2020.

In addition, the following two new technologies have been established. One is the introduction of the 8-inch process line, which succeeded in increasing the size of the sensor. It has already achieved the same characteristics as the proven 6-inch line, and production started in February 2023. The other is bidding on the flip chip bonding assembly market with our pixel sensor and customer-supplied ASIC. This talk will discuss in detail our efforts in developing a new sensor for the HL-LHC upgrade.

### **Submission declaration**

Original and unpublished

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