Performance study of large-area silicon sensors

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With the increasing demand for precision in high-energy physics experiments and the development of particle flow algorithms, the requirements for calorimeters tend to be more compact and finely segmented. Silicon-based calorimeters, composed of multiple layers of silicon detectors and absorber materials, play a crucial role in meeting these requirements. One significant advantage of silicon-based calorimeters is their ability to provide precise position information for clusters. At the core of silicon calorimeters are silicon sensors, which serve as the fundamental building blocks. These sensors, particularly large-area ones, offer extensive sensitive areas. Each sensor is divided into numerous small units, enabling independent readout for each unit. The utilization of large-area silicon sensors not only reduces the overall sensor count within the detector but also contributes to cost savings.

At IHEP, we are committed to studying the performance of 8-inch HPK silicon sensors for the CMS HGCal upgrade. Additionally, we are actively preparing for the development of 6-inch silicon sensors produced in China. The aforementioned information will be introduced in this report.

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