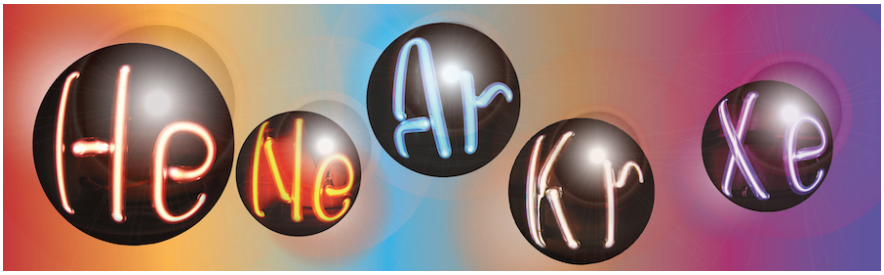


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# Development of a Silicon Interposer with an Ultralow Radioactivity Background

*Wednesday, 22 October 2025 13:30 (20 minutes)*

Developing a photodetector system with an ultralow radioactivity background is crucial for experiments focused on detecting rare events. Silicon photomultipliers (SiPMs) and application-specific integrated circuits (ASICs) are ideal for low-background photosensors and readout electronics, respectively, as they can attain high radiopurity without significant additional effort. However, interposers, which provide mechanical support and signal routing between the photosensor and electronics, pose a challenge in constructing ultralow-background photodetectors. Motivated by the requirements of the nEXO project, IHEP and IME developed the first prototype of a silicon interposer in 2018 with a size of 10x10 cm² and a thickness of 320 μm, based on double-sided TSV interconnect technology. Following this, the technologies were further refined through four additional production runs of interposers. Each run involved careful evaluation of both the electrical and mechanical performance of the interposers across a range of temperatures, from room temperature to liquid xenon temperature. Results from the third and fourth runs indicate that the interposers can meet the nEXO project's requirements. In this talk, we will highlight the development of silicon interposer technology and evaluate the performance of the interposers.

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