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## Radiation-Induced Correlated Events in Layered Superconducting Detectors

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Here, we present the LLNL Cosmic Sandwich, a detector consisting of three cm<sup>2</sup>-scale sapphire substrates layered in close vertical proximity. The middle section of the Sandwich comprises an array of transmons patterned on the surface, and the top and bottom substrates each have grids of microwave kinetic inductance detectors (MKIDs). This detector package enables tagging of events that are coincident among multiple sensors (or qubits) on the same substrate, as well as across different substrates within the Sandwich. Through these coincidence events, we can tag which types of radiation (gammas, alphas, muons, etc.) are the most problematic for causing events correlated among the sensors.

At PNNL, we have the capability to install a variety of known radioactive sources close to the Sandwich and observe the extent of the observed correlated events. In this contribution, we will review the design of the LLNL Cosmic Sandwich, as well as its constituent sensors. We will further show preliminary results of these studies in various irradiated conditions and connect these observations to the priorities of the superconducting qubit community.

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