

Fabrication Process for Superconducting Transition-edge Sensor

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A transition-edge sensor (TES) is a superconducting film operated in the narrow temperature region between the normal and superconducting state, where the electrical resistance varies between zero and its normal value. It is also called a superconducting phase-transition thermometer (SPT). A Ti/Au bilayer was formed by e-beam evaporation and patterned by wet etching on top of a SiN_x membrane. A small piece of high purity Sn was attached to the TES bilayer as a superconducting absorber for gamma rays. The mechanical support and the thermal contact between the Sn absorber and the TES thermometer were made with Stycast epoxy. In the presentation, detailed fabrication processes are discussed with the current performance for cryogenic particle detection.

Keywords: TES, fabrication, sensor, transition-edge