Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

Fabrication of a Low Radioactive Background Temperature Sensor on a Parylene Substrate ANKUR DHAR, University of California Berkeley, JAMES LOACH, ALAN POON, Lawrence Berkeley National Lab — Searches for rare nuclear processes are at the center of many research programs in nuclear and particle physics and as these experiments increase in sensitivity there is an growing need for materials with higher radiochemical purity. A particular need is for low-background electronic circuitry and sensors, an example of which is a temperature sensor for use in neutrinoless double beta decay and dark matter experiments. In this work a thin-film temperature sensor is fabricated from radio-pure materials to provide a clean alternative to conventional platinum or silicon diode sensors. Parylene is used as a substrate for sputtered gold-titanium traces shaped using photolithography and bonded to parylene-coated copper signal wires; the whole sensor is the then sealed with a second layer of parylene. Parylene is a promising substrate material for low-background electronics and this work represents a proof-of principle and a first step on the road to more complex sensor electronics.

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Date submitted: 01 Aug 2011 Electronic form version 1.4