Contribution ID: **168** Type: **Poster**

Validation of Parylene coating to suppress alpha contamination on the copper surface in CUORE bolometers

Wednesday, 11 September 2013 19:30 (2h 30m)

Background rate reduction is of utmost importance for neutrinoless double beta decay experiments like CUORE (Cryogenic Underground Observatory for Rare Events). A major source of background for CUORE comes from surface contamination from inert materials, mainly degraded alphas from the supporting copper structure of the bolometer modules. We investigated a novel alpha background suppression technique using conformal polymer coating with Parylene in a bolometric validation run. A 50 micron thick layer of Parylene coating on the copper structure surface was chosen to effectively range out degraded alphas. The measured alpha background rate and its implications will be discussed.

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Session Classification: Poster Session

Track Classification: Double Beta Decay