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An Indium Solder Flat Seal for the Assembly of Large-Area Planar MCP-based Detectors Without Vacuum Transfer of the Window (12' + 3')

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In order to bring the price down of MCP-based detectors such as the LAPPDTM, we are developing an assembly process that does not involve an expensive vacuum transfer. This process requires making a hermetic seal between the top window and the detector body during the detector bake-out in vacuum. We have demonstrated a robust technique to make a hermetic indium vacuum seal between a glass window and detector body along the 90-cm-long perimeter. In this technique, two flat glass surfaces with pre-deposited thin metalization 'tie' layers are bonded together by an indium solder at the bake-out temperature of $\sim 300\text{C}$. We discuss the metallurgy of the seal in which thin metalization layers on glass have been exposed to molten indium at high temperatures over an extended period of time.

Primary authors: ELAGIN, Andrey (University of Chicago); SPIEGLAN, Eric (University of Chicago); ANGELICO, Evan (University of Chicago); FRISCH, Henry (University of Chicago); JARRETT, Robert (Indium Corporation)

Presenter: ELAGIN, Andrey (University of Chicago)

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