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Understanding KamLAND's Detector Response: Instrumentation forKamLAND's Full-Volume Calibration System LINDLEY WINSLOW, Lawrence Berkeley National Lab , KAMLAND COLLABORATION — The KamLAND collaboration has developed a novel deployment system forthe positioning of radioactive calibration sources throughout theentire fiducial volume of the detector. This calibration device uses avariety of systems including inclinometers, pressure sensors, and theimaging of infrared LEDs to monitor its position. The calibrationsystem is also fitted with several low-activity $Co/^{60}$ sourcesthat will allow us to reconstruct its position using photomultipliertube information. The combination of these methods will provide anaccuracy of $\sim$2cm in the calibration source position. Mapping thevertex reconstruction bias throughout the detector volume is essentialfor reducing the fiducial volume uncertainty and improving theabsolute $\overline{\nu}_e$ flux measurement. Further studies of thedetector's energy scale and response will help with the measurement ofthe observed spectral distortion and the associated oscillationparameter Δm^2_{12}.

Lindley Winslow
Lawrence Berkeley National Lab

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