

Abstract Submitted
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In-situ wavelength calibration and temperature control for the C-Mod high-resolution x-ray crystal imaging spectrometer LUIS F. DELGADO-APARICIO, PPPL, Y. PODPALY, M.L. REINKE, C. GAO, J. RICE, MIT-PSFC, S. SCOTT, M. BITTER, K. HILL, PPPL, P. BEIERSDORFER, LLNL, D. JOHNSON, J.R. WILSON, PPPL — An x-ray crystal imaging spectrometer with high spectral and spatial resolution is currently being used on Alcator C-Mod to infer time histories of temperature and velocity profiles. An in-situ wavelength calibration using a 1 μm palladium filter in between the crystal and the detectors of choice is being proposed as a natural wavelength-marker using the transmission changes across the L-II and L-III edges at 3722.9 mA and 3907.1 mA, respectively. Recent results also indicate that the crystal temperature should be kept constant within a fraction of a degree since the thermal expansion of the quartz crystal will change the interplanar ($2d$) spacing and introduce fictitious velocity measurements of several km/s. A detailed temperature scan indicates a thermal expansion coefficient (α_{\perp}) of $13.5 \times 10^{-6} / ^{\circ}\text{C}$ and thus a false Doppler shift of $4.05 \cdot \Delta T [^{\circ}\text{C}]$ km/s.

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