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Diagnostics of Deformation in Thin Diamonds for Coherent Bremsstrahlung Radiators RICHARD JONES, MATTHEW DEMAS, ALISA ENGSBERG, University of Connecticut, GUANGLIANG YANG, University of Glasgow, GLUEX COLLABORATION[1] — The coherent bremsstrahlung beam line for Hall D at Jefferson Lab requires diamond radiators as thin as possible to reduce the effects of multiple scattering on the photon beam divergence. At thicknesses below 100 microns, stresses on the diamond, both from the way the crystal is mounted and from internal defects, can produce significant warping which degrades the coherent edge and polarization of the beam. The goal for Hall D is to use diamonds of 20 microns thickness. A 20 micron diamond from Element Six was studied using X-ray diffraction at the Cornell CHESS synchrotron facility. The diamond showed a large amount of warping across the entire face of the crystal. Benchtop measurements of surface curvature using a Michelson interferometer are being explored that would provide immediate feedback on crystal flatness and enable rapid studies of different mounting techniques.

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