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Design and Characterization of a Novel Near Field Detector for Three Dimensional X-ray Diffraction SCOTT ANNETT, LAWRENCE MARGULIES, Univ of Guelph, DARREN DALE, Cornell High Energy Synchrotron Source, Cornell University, STEFAN KYCIA, Univ of Guelph — Three dimensional x-ray diffraction microscopy (3DXRD) is a powerful technique that provides crystallographic and spatial information of a large number of grains in a sample simultaneously. A key component of a 3DXRD experiment is the near field detector which provides high resolution spatial information of the sample. A novel design for a near field detector was developed and characterized. This design, called the Quad Near Field Detector, utilizes four quadrants, each with a dedicated scintillating phosphor and optical microscope. A novel translation stage for focusing the microscopes was developed, tested, and implemented. The near field detector was calibrated and characterized at the Cornell High Energy Synchrotron Source. A flood field correction was developed for the detector to correct for variations in intensity response. Diffraction data of all four quadrants was able to reproduce the crystal orientation of the ruby calibrant. In conclusion, the design and implementation of the Quad Near Field Detector was a success and will be a useful tool for future 3DXRD experiments.

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