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### **3-D MEASUREMENT OF DEFORMATION MICROSTRUCTURE IN Al(0.2%)Mg USING SUBMICRON RESOLUTION WHITE X-RAY MICROBEAMS\***

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We have used submicron resolution white x-ray microbeams on the MHATT-CAT beamline at the Advanced Photon Source to investigate, in three-dimensions, the deformation microstructure in a 20% plane strain compressed Al(0.2%)Mg tri-crystal. K-B mirrors were used to focus the white beam of the MHATT-CAT undulator to a  $0.7 \times 0.7 \mu\text{m}^2$  beam, which was scanned over bi- and tri-crystal regions near the triple junction of the tri-crystal. White beam Laue photographs were collected using a CCD x-ray detector. Depth resolution along the x-ray microbeam of 2-3 microns was achieved by triangulation back to the diffraction source point through the use of CCD pictures taken at a series of 11 different distances, varying from 25 - 50 mm from the sample. Computer indexing of the deformation cell structure in the bi-crystal region provided orientations of individual grains to 0.01 degrees, making possible detailed measurements of the rotation axes between individual cells. The techniques used in making the measurements and the analyses, and the potential of white microbeam x-rays for the investigation of materials microstructure and microstructural evolution will be discussed.

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