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## A study of stress gradients in a titanium alloy

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### ABSTRACT

A study of the stress gradient developed in a Ti-7AL sample is examined using the technique of High-Energy Diffraction Microscopy. The experiment is conducted at beamline 1-ID of the Advanced Photon Source of Argonne National Laboratory, using high-resolution monochromator. A map of grain orientation in the cross-section of the sample is determined through use of a near-field technique. The near-field study is complemented by analysis using data from a far-field detector to develop lattice strain on a grain-by-grain basis. A state of bending with superposed tension is revealed through correlation of the near-field grain map with the far-field center of mass result. A comparison of “macro” stress and the “grain scale” stresses is featured. An assessment is given on the benefits and limitations of using the high-resolution monochromator in the strain analysis of far-field detector images.