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# Bragg-edge Neutron Strain Tomography

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Bragg-edge residual strain tomography has been achieved for the first time in general two-dimensional systems. This approach allows the reconstruction of detailed stress and strain distributions within polycrystalline solids from sets of Bragg-edge transmission strain images.

In contrast with traditional scalar tomography, this problem is ill-posed due to an issue surrounding the uniqueness of solutions - infinitely many strain fields can give rise to the same set of Bragg-edge images. Work over the last decade has provided some solutions to this problem for a limited number of special cases. Our approach to this problem was to develop a reconstruction algorithm for arbitrary systems based on a least squares process constrained by equilibrium.

This presentation will outline this approach and provide details of an experimental demonstration on two samples using data from the RADEN instrument at the J-PARC spallation neutron source in Japan. Validation of the resulting reconstructions is provided through a comparison to conventional constant wavelength strain measurements carried out on the KOWARI engineering diffractometer within ANSTO in Australia.

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