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**Finite Crystal Size Effects in Dynamic Diffraction Experiments on 4th Generation Light Sources** JUSTIN WARK, EDWARD ROWE, OLIVER KARNBACH, DAVID MCGONEGLE, JACK FRASER, OLIVER HUMPHRIES, University of Oxford — Femtosecond pulses of x-rays emitted from 4th generation light sources are now routinely used to diagnose transiently laser-ablatively compressed crystals via x-ray diffraction.[1- 3] Typical x-ray spot sizes employed are a few tens of microns in diameter. As a result, when diffracting from polycrystalline materials, the x-ray beam only interacts strongly with a limited number of grains within the sample, to the degree that meeting the Bragg angle within the rocking curve width for any one of them can become improbable. We examine here the influence that this finite number of grains has on the resultant main diffraction patterns,[4] as well as discussing the implications of the resultant diffuse elastic scattering features on attempts to make direct temperature measurements via inelastic scattering from phonons.[5]

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(5) E.E. McBride *et al.*, Rev. Sci. Instrum. **89**, 10F04 (2018)

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