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## Local elastic strain and strain tensor measurements of deformed metals using focused, submicrometer Xrays

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### ABSTRACT

The use of depth resolved, submicrometer X-ray beams for studying deformation microstructures in plastically deformed metals has come a long way over the past 5 years. We can identify phases, measure crystallographic orientations, and measure lattice constants from buried, submicrometer sample volumes throughout extended sample regions within single crystal and polycrystalline samples. In special cases, we can also measure both deviatoric and complete elastic strain tensors with reliable uncertainty estimates for the tensor components. Examples of these capabilities will be described, including nondestructive, full strain tensor measurements from through-Si vias in microelectronics, and strain measurements from commercial Al alloys deformed using equal-channel angular pressing. Expectations for the future will also be discussed.