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3D Material Characterization by Laminographic Imaging: Status and Prospects

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Laminography enables non-destructive 3D imaging, achieving high resolutions with multiple contrasts for selected regions of interest even for large and laterally extended samples exceeding the view field. We continuously progress in the theoretical description of the methodology, in the construction of dedicated instrumentation, the measurement procedures, and the algorithms for data analysis.

With the recent development of X-ray Diffraction Laminography (XDL) within the German-Russian BMBF project STROBOS-CODE, for example, laminography has been extended with Bragg-diffraction contrast [1]. This enables the 3D characterization of crystal defects like complex dislocation networks with a few micrometer spatial resolution, within large crystal volumes as typical e.g. for technology-relevant semiconductor wafers. By the correlative analysis of XDL with data obtained by means of complementary techniques, we could gain new insight into the onset of thermal slip in silicon wafers under processing-relevant conditions [2, 3].

References:
[1] Hänschke et al., APL 101, 244103 (2012).
[2] Hänschke et al., PRL 119, 215504 (2017).
[3] Redmond, MRS Bulletin 43, 11 (2018).

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