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Application of deconvolution in 4D STEM diffraction analysis

Friday, 21 June 2024 16:10 (15 minutes)

The presentation will cover the new 4D-STEM PNBD (Powder Nano Beam Diffraction) analytical method developed in collaboration with UTIA, UMCH and UPT. In the introduction we will explain the principle of the method itself, its advantages, importance and limitations. One of the major limitations is the low accelerating voltage of scanning electron microscopes, which results in heavily noisy diffractograms with a high degree of blur. We will discuss the possibility of using deconvolution algorithms to improve the quality of diffractograms, reduce the effect of noise and improve the overall crystallographic analysis. We will briefly introduce the deconvolution algorithms used and their principle. Furthermore, a number of methods for estimating the impulse response of an electron microscope will be presented. Existing results will be discussed and we will also briefly introduce the possibility of using segmentation neural networks for analysis, trained on synthetically generated data.

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Session Classification: Data Processing