INVESTIGATION OF METALLIC MATERIALS BY USING NOVEL MULTIDIMENSIONAL TRANSFER FUNCTIONS

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The increasing importance of computed tomography in materials science entails new challenges for the required visualization tools. One of the central tasks is the identification and characterization of different constituents in the microstructure of the sample in view. The essential advantage of computed tomography lies in the coverage of the whole sample-volume with regard to apparent differences in density within the object and being able to determine their size and position.

Samples of metallic materials often comprise a number of phase boundaries. Therefore an essential requirement for exploration of the sample and quantification of the results is to locate and identify those boundaries.

In order to ensure comprehensive knowledge of the microstructure, which is the basis for high product quality, even smallest inhomogeneities within these materials are to be detected. This can be achieved by using CT equipment especially designed for this task, while in data-processing customized visualization tools have to be used, since classification by using density values alone, in many cases does not deliver the desired results.

In this work multi-dimensional transfer functions are chosen as an approach to the problem. Starting from “classical” two-dimensional transfer functions, as well as novel ones, possibilities in the visualization of metallic samples are presented by using novel multi-dimensional transfer functions. These transfer functions allow clearly improved visualization of material boundaries, surfaces and inclusions, with continued interactive representation. This provides the basis for improved quantification and characterization of different phases within the material.