

Interactive Analysis of Multi-modal Confocal Raman Microscopy Data

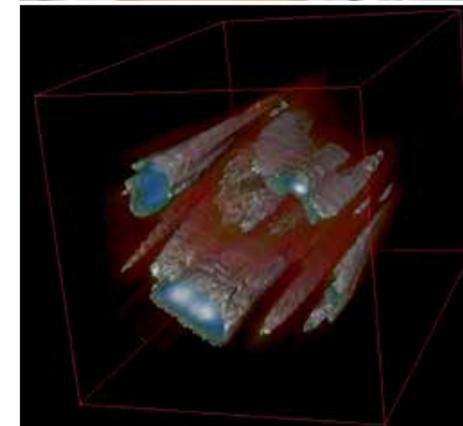
The DFG-project "Interaktive multifunktionelle konfokale Bildanalyse" involves the analysis and visualization of the measurement data obtained from our multispectral confocal Raman microscopy system. Specifically, the motivation of the project is to detect constituting components and physical structure of the specimen and present the results in a concise and intuitive manner. There are several issues to be considered to realize the mentioned objectives. Imperfections in data due to the blurring and noise should be dealt with and the dimensionality of data should be reduced without impairing the data fidelity.

An important aspect of the project is to identify constituting components by comparing the measurement data with a spectral database. The database should be hierarchically structured for a faster search. Another challenge of spectral classification is that the spectrum of each spatial location is usually composed of a mix-

ture of pure reference spectra. This complication is usually tackled with a linear unmixing method.

The visualization stage of the resulting system should have an interactive performance. 3D visualization is realized by ray casting which has become a standard volume rendering method producing high quality visualization in interactive speeds. One of the aims of the project is to provide the users with an intuitive interface, through which mapping from the data domain to visual domain can be modified.

Furthermore the Raman microscope will be coupled with dCAM which is a new 3D imaging technology developed at the ZESS in 2000-2005. dCAM stands for "direct Confocal Absorption Microscopy", which uses the inherent absorption of some markers in the specimen. This patented technology has a high sensitivity and high spatial resolution.



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