



# ESPRIT QUBE

- Advanced 3D analysis of EBSD/EDS data

ESPRIT QUBE is the most advanced analytical software platform for processing and visualizing 3D EBSD and EDS data cubes. The core of its state-of-the-art algorithm is based on quaternion units that offer the best solution for interpolating intermediate steps in rotations about arbitrary axes in a 3D space.

## Quaternion-based core

- All calculations are true 3D

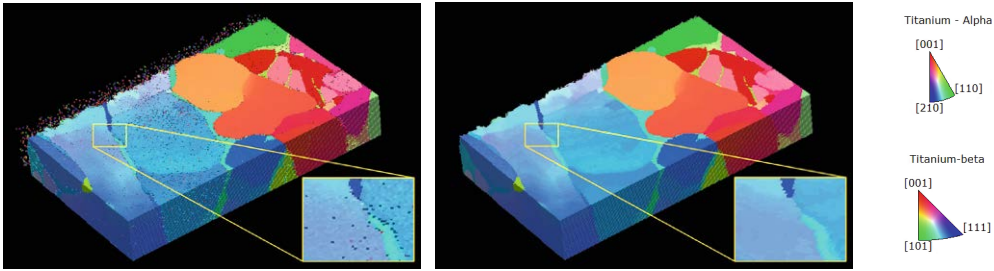
## Dataset editing and filtering

- Slice alignment, cropping and deletion
- Gauss, median and Kuwahara filters

## Voxel based data analysis

- Grain reconstruction
- Local average disorientation (LAD)
- Geometrically necessary dislocations (GNDs) density
- Orientation distribution (Inverse pole figure map, Euler map)
- Schmid factor map
- Phases map
- Pattern quality map
- Grain orientation mean map
- EDS counts map

## Dataset filtering – Optimized data quality for advanced 3D analysis



Left: Raw data cube acquired from a TA6V sample. Right: Same data cube after applying “despeckle” and “median” filters. Misindexed and isolated voxels can be removed using the “despeckle” filter while linear (Gaussian) and non-linear (Kuwahara and median) filters offer advanced orientation averaging capabilities.

### Extensive data subsetting options

- Phase and grain “metrics” subsetting, e.g. neighbors, volume, area, shape
- Texture component subsetting
- LAD based subsetting

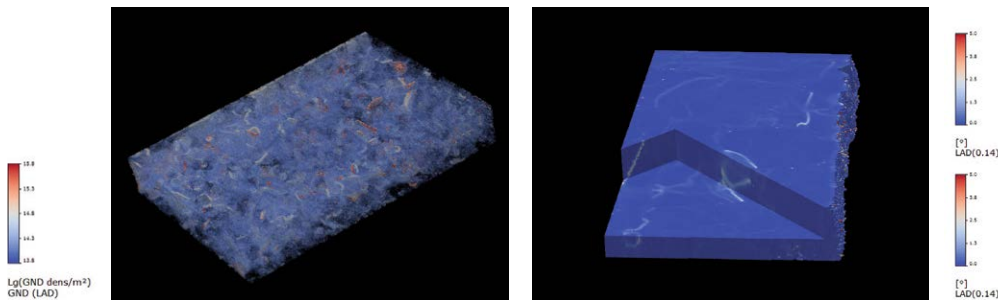
### Multiple 3D visualization and exploration capabilities

- Simulation of EBSD/EDS data cubes
- 3D cursor and multiple slice & dice options for advanced data interactivity
- Multiple data cube illumination, coloring code and scaling options
- Grain list for easy access to single or multiple grains in the data cube

### Dataset formats and data handling options

- Export/import of HDF5 formatted files
- Supported import file formats: \*.bcf, \*.ctf, and \*.ang
- File export in \*.vtk format for visualization in open software
- “Project” style workspace for easy data handling
- “Event log” workspace for easy access to all processing steps applied to current data cube
- QUBE project file option for saving current data cube while all processing steps are already applied

## 3D EBSD insights into the deformation mechanisms of materials



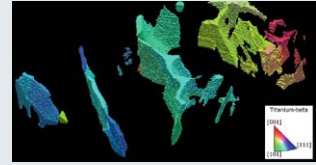
Left: Geometrically necessary dislocation (GND) density distribution in Ni alloy. Right: Local average disorientation (LAD) in dual phase TA6V alloy. ESPRIT QUBE is the perfect tool for voxel based investigation of plastic deformation phenomena in materials using 3D EBSD data.

### ● Bruker Nano GmbH

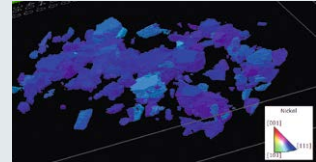
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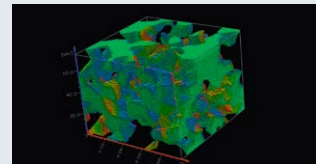
## Data subsettings



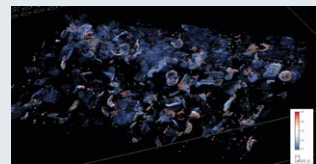
Phase based subset showing the Ti-beta grains colored based on the standard IPF triangle



Subset based on a texture component, here the {111} fiber along the normal to the sample surface



Simulated EDS data cube for a single, pure element phase – blue and red areas indicate the phase of neighboring grains



Subset based on LAD values

