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

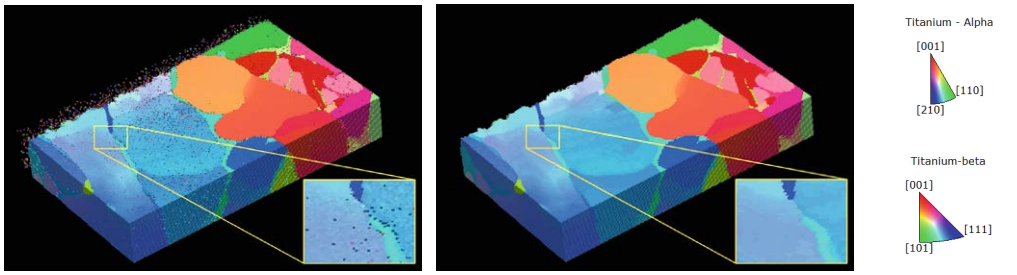
Dataset editing and filtering

- 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

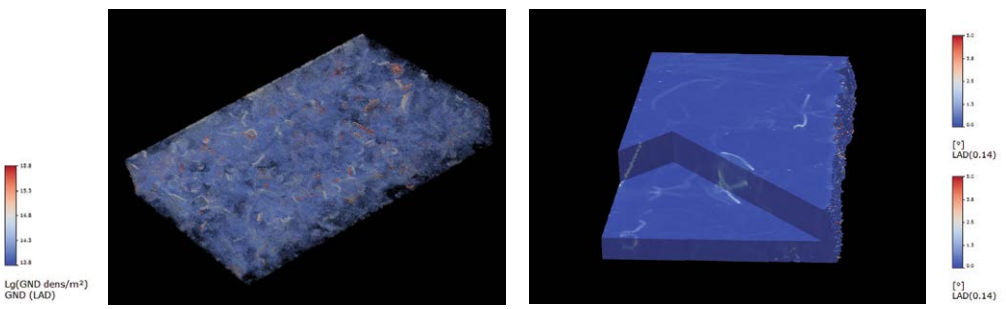
Multiple 3D visualization and exploration capabilities

- 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

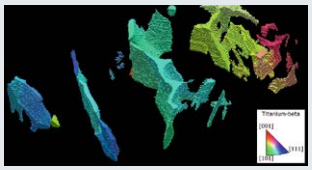
- Export/import of HDF5 formatted files
- Supported import file formats: *.bcf, *.ctf, and *.ang
- File export in *.vtk format for visualization in open software
- "Project" style workspace for easy data handling
- "Event log" workspace for easy access to all processing steps applied to current data 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

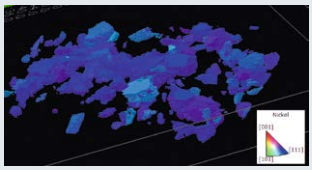


Left: Geometrically necessary dislocation (GND) density distribution in Ni alloy. Right: Local average disorientation (LAD) in dual phase TA6V alloy. ESPRIT QUBE is the perfect tool for voxel based investigation of plastic deformation phenomena in materials using 3D EBSD data.

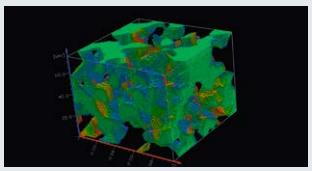
Data subsettings



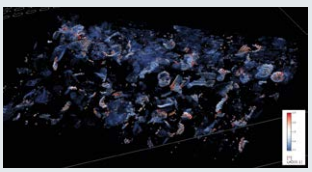
Phase based subset showing the Ti-beta grains colored based on the standard IPF triangle



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

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