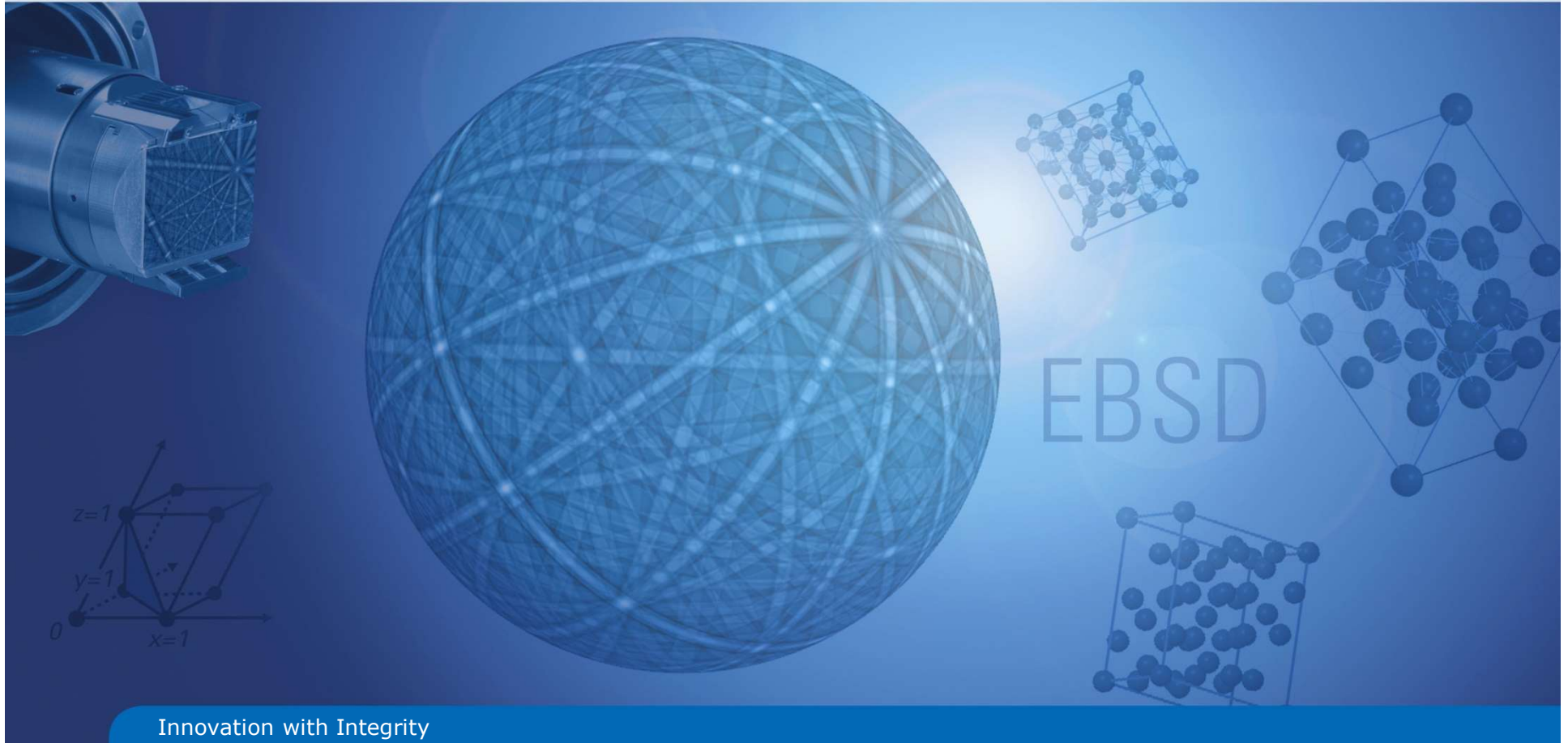


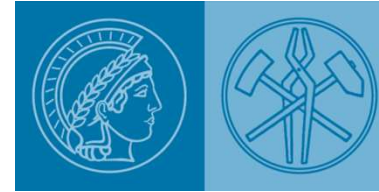
# Latest developments in advanced 3D EBSD/EDS data processing with ESPRIT QUBE



Free online webinar – May 5<sup>th</sup> 2020  
Bruker Nano, Germany



# Presenters



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Senior Data Scientist, Bruker Nano Analytics

MPIE Max-Planck-Institut für Eisenforschung, Düsseldorf

# Latest developments in ESPRIT QUBE

## Webinar outline

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- Grain boundary network on experimental examples
- Analysis of 3D tomographic datasets with ESPRIT QUBE
- Q&A



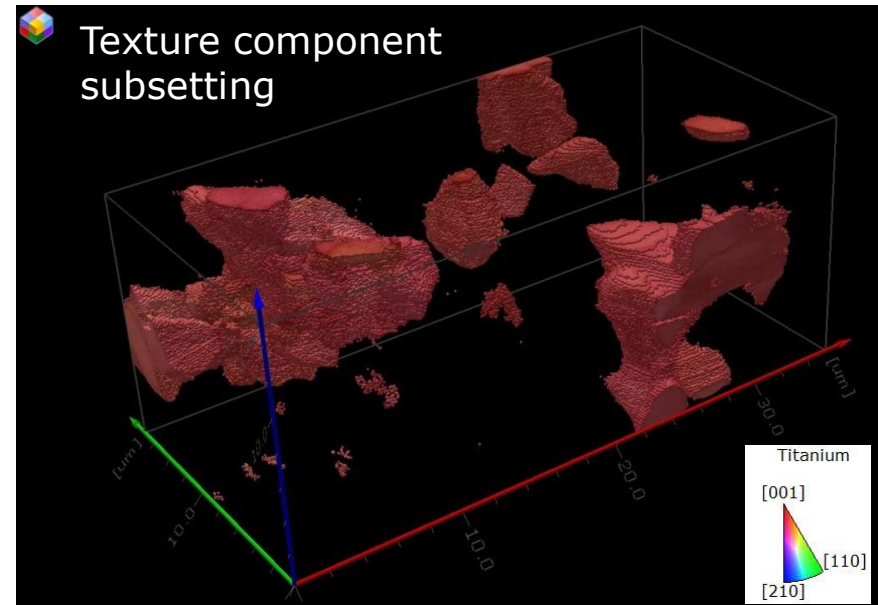
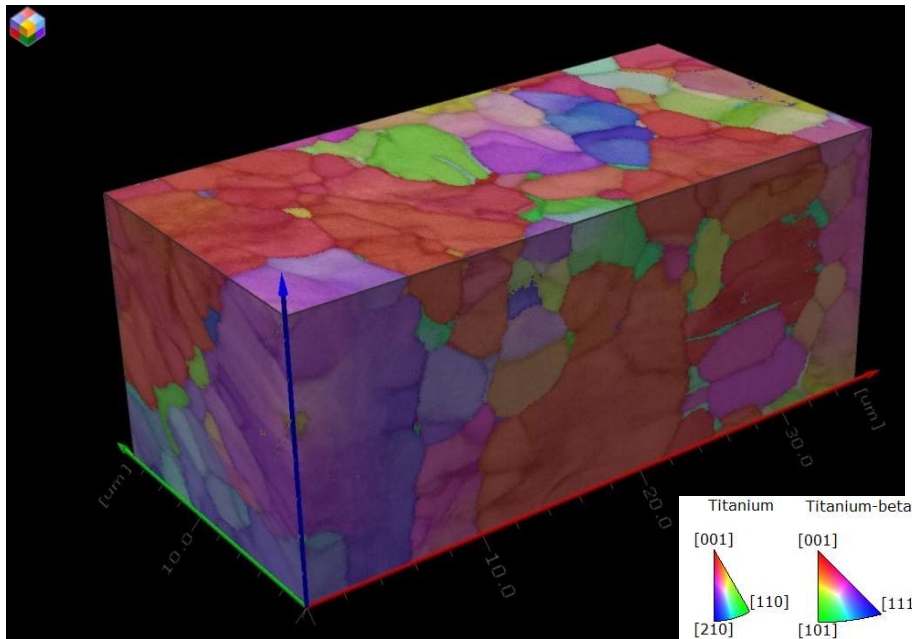
# Grain boundary network on experimental examples

# ESPRIT QUBE

## 3D data processing – Ti alloy example



- Deformed Ti alloy (alpha and beta phases)
- Large data cube – 245 slices ( $35 \times 20 \times 20 \mu\text{m}^3$ )
- Serial sectioning using a PFIB-SEM (FEI) with non-static 3D
- Slice preparation time:  $\sim 2 \text{min/slice}$
- 3D EBSD data acquisition time:  $\sim 7 \text{min/slice}$

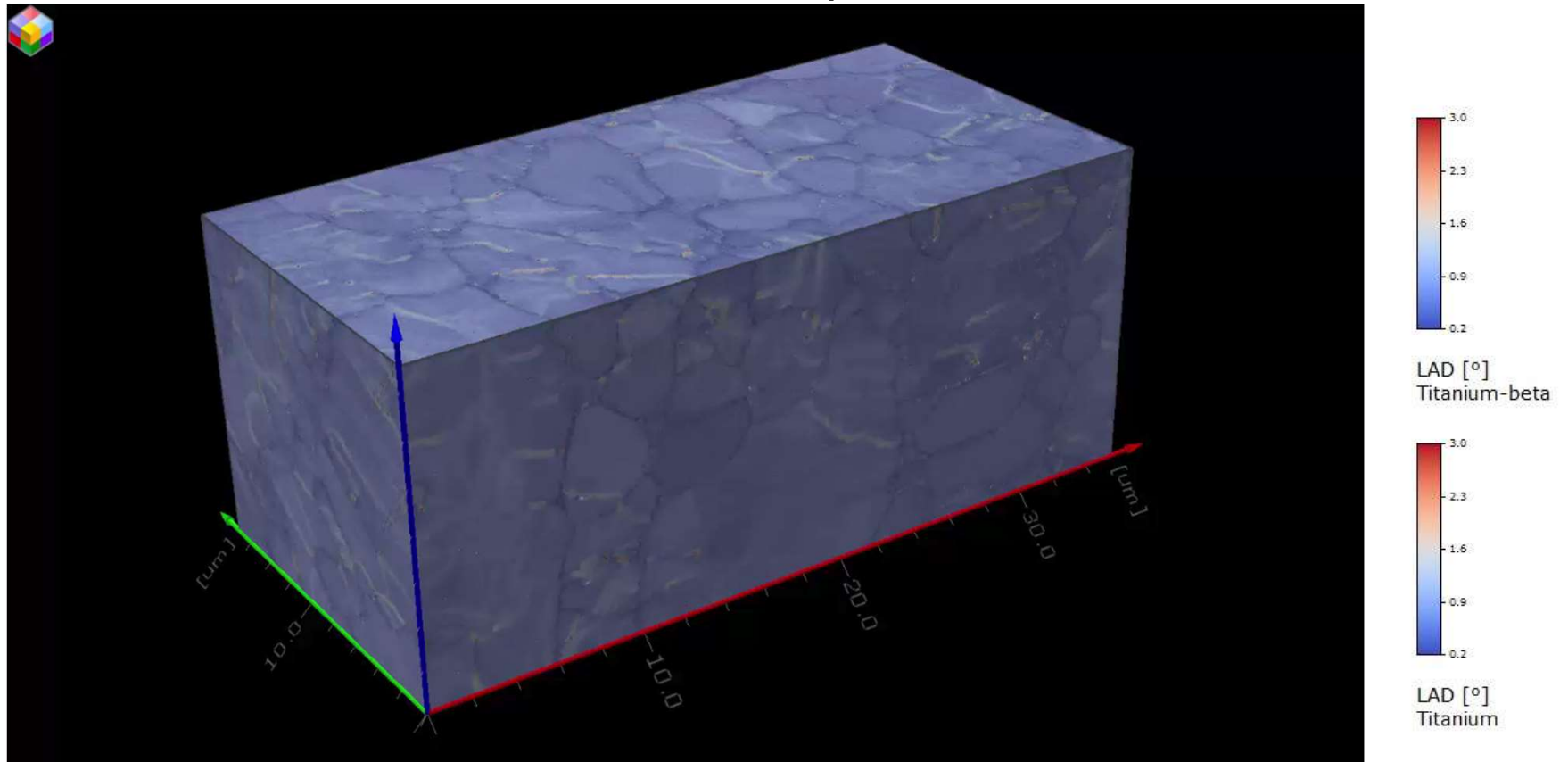


# ESPRIT QUBE

## 3D data postprocessing – Local Average Disorientation

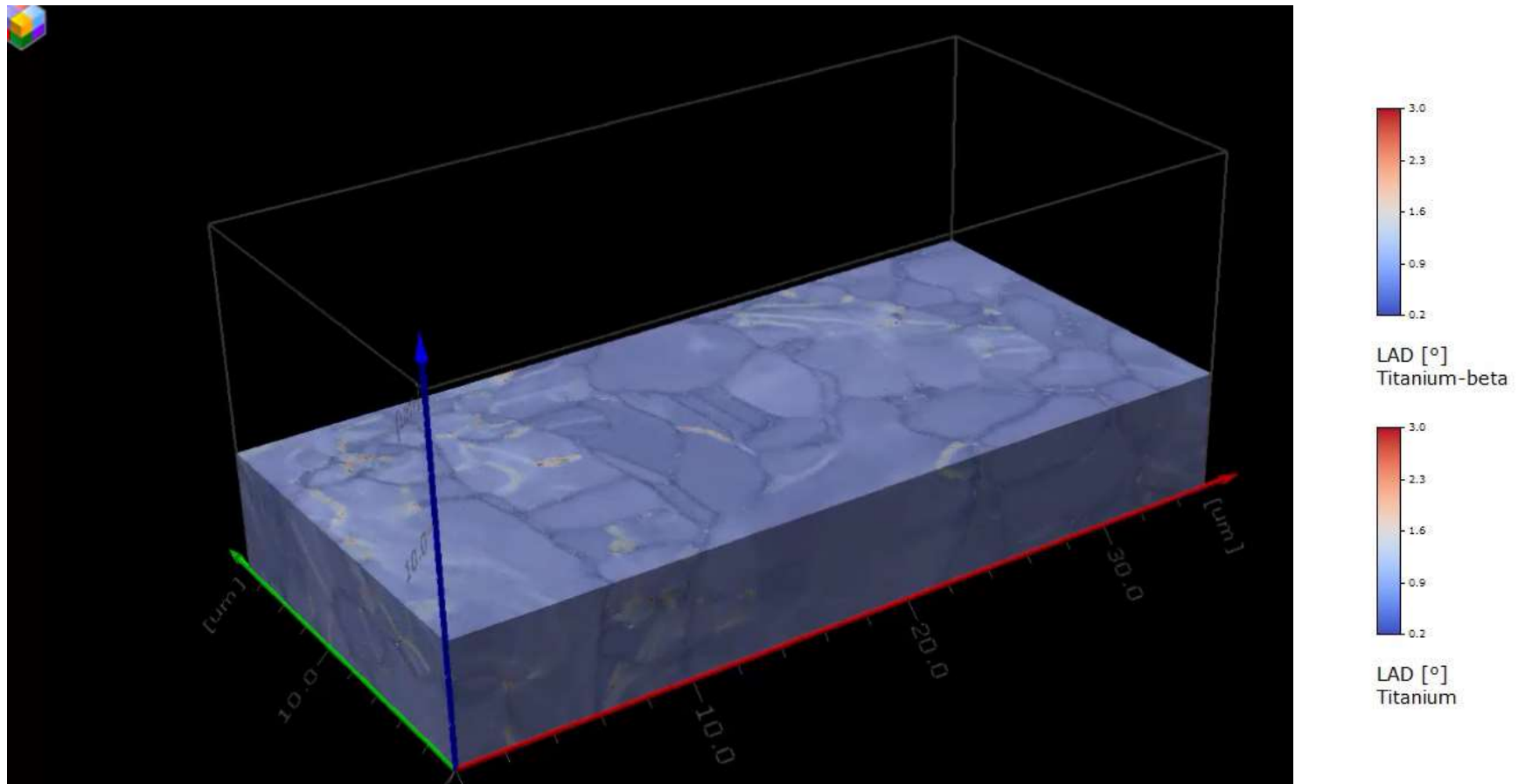


### 3D EBSD on deformed Ti alloy – LAD visualization



LAD after slice realignment & data filtering

### 3D EBSD on deformed Ti alloy – LAD visualization

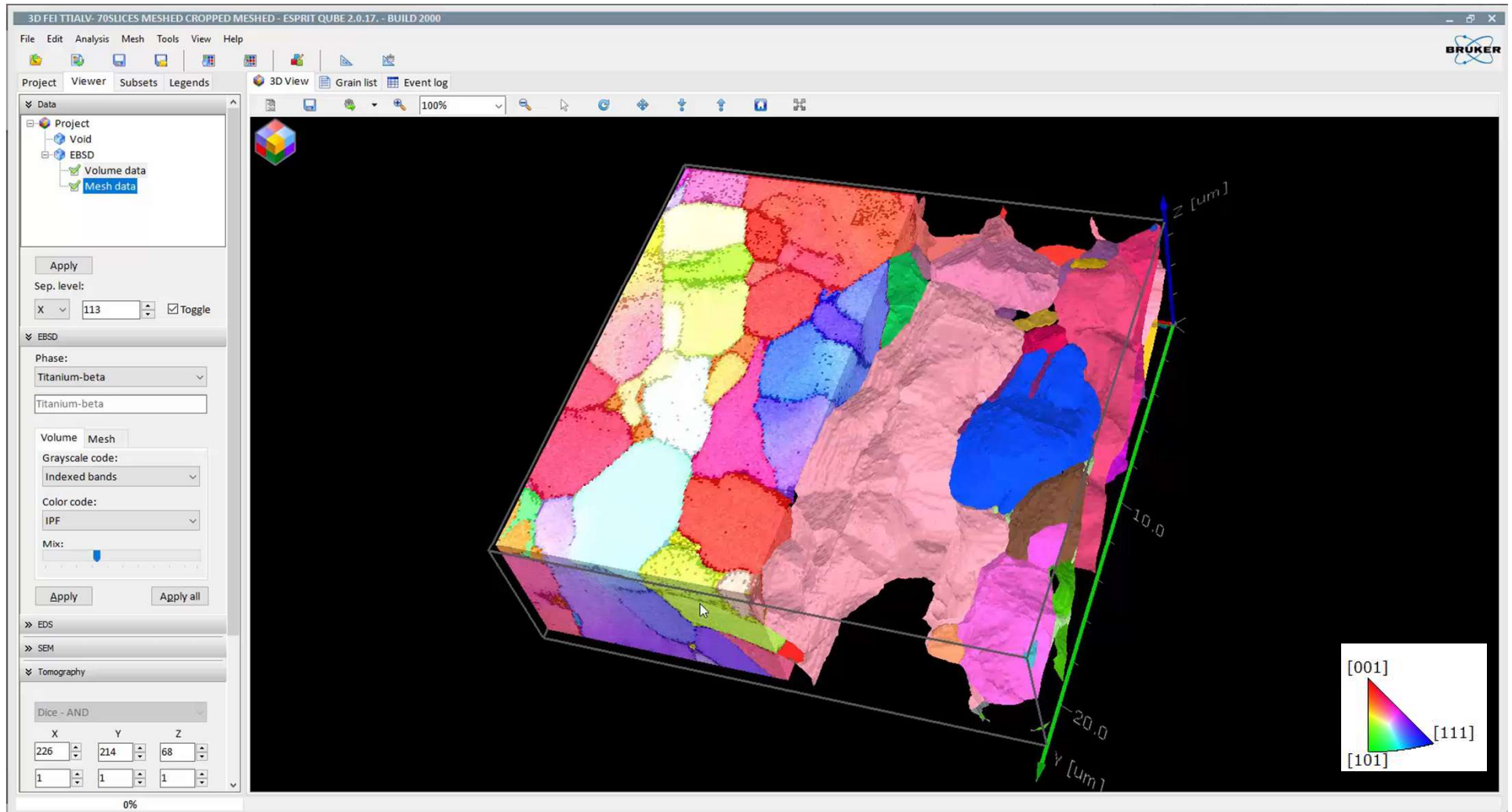


LAD after slice realignment & data filtering



# ESPRIT QUBE

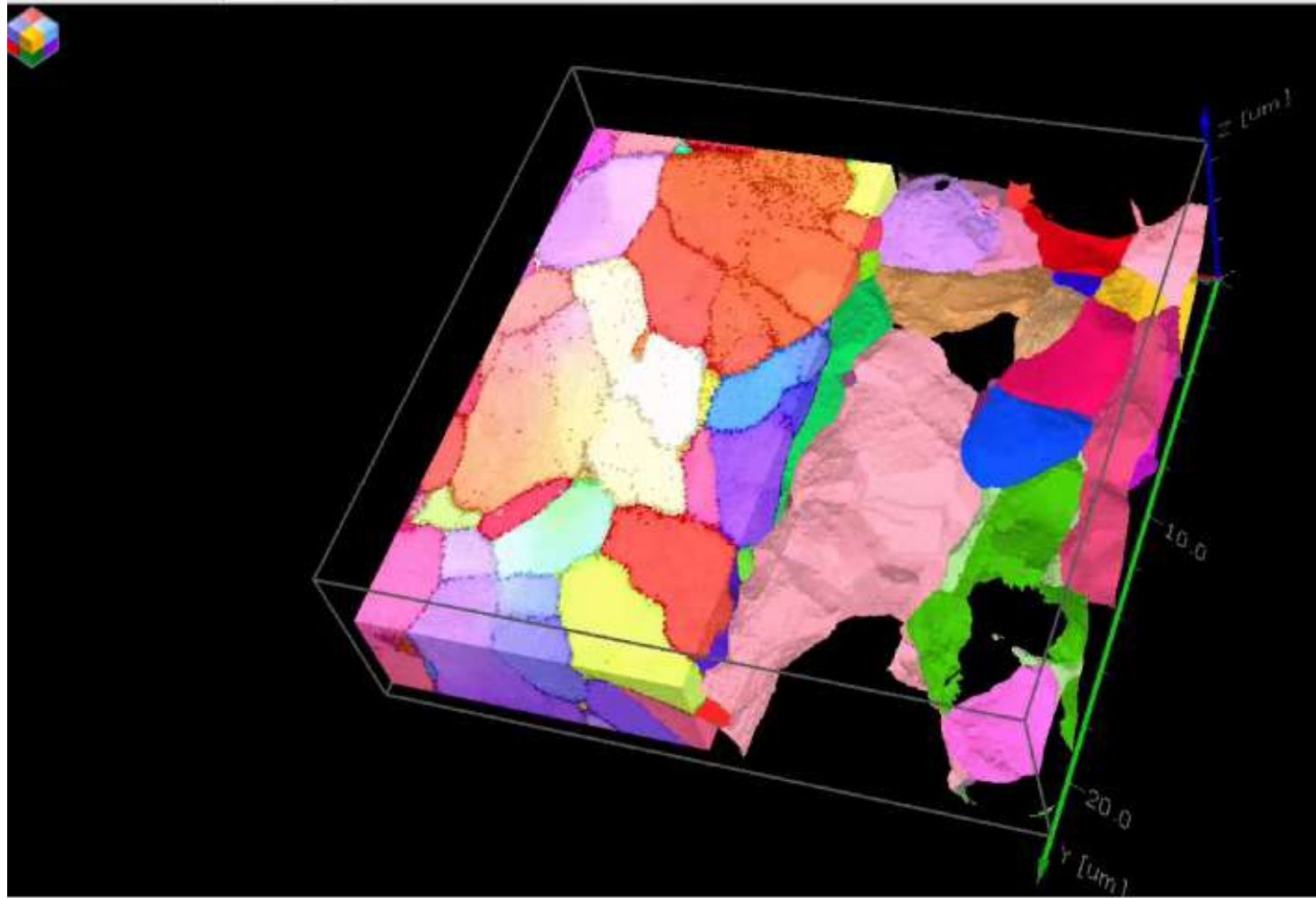
## Grain Boundary network – Ti alloy





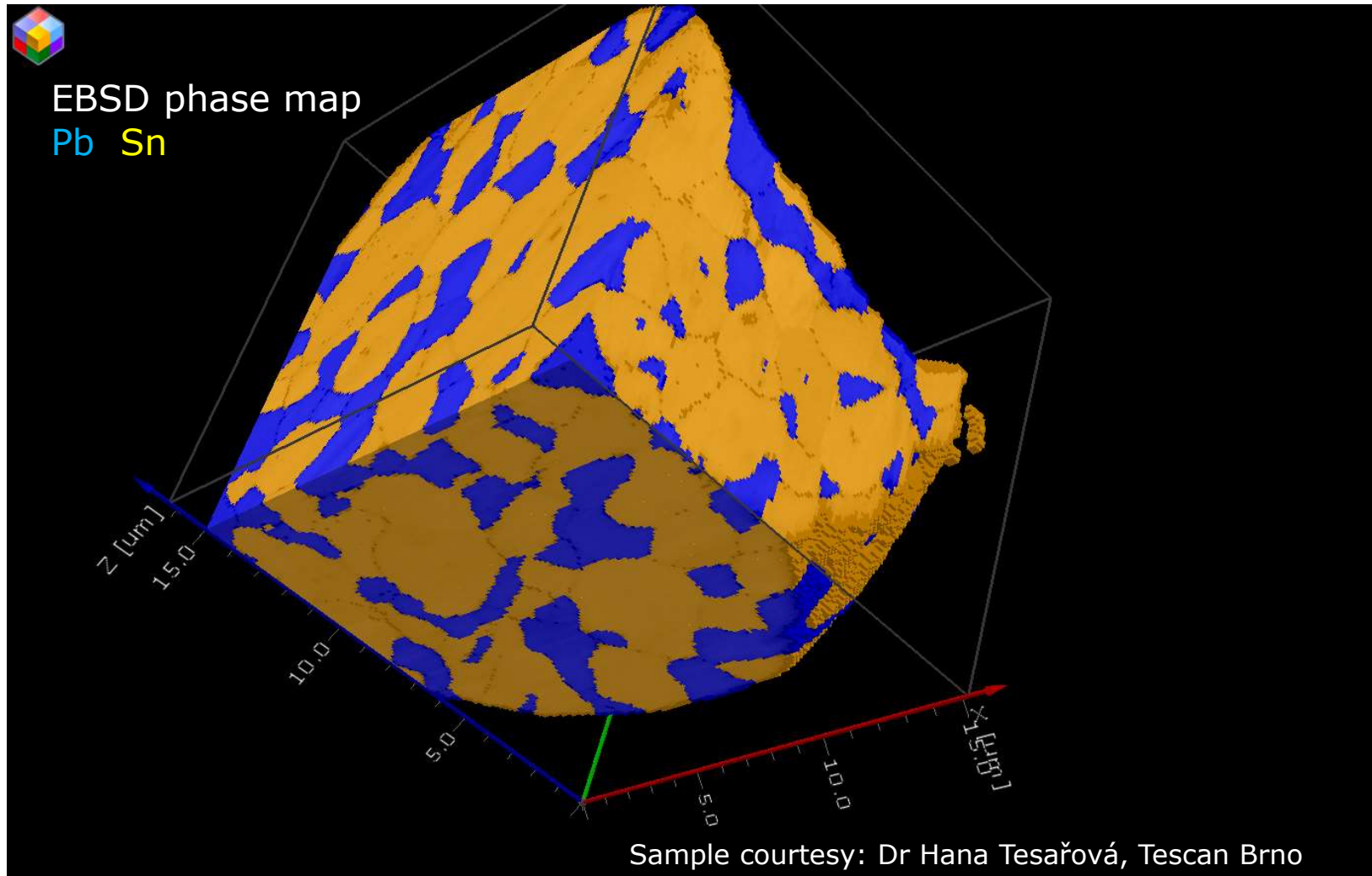
# ESPRIT QUBE

## Grain Boundary network – Ti alloy



# ESPRIT QUBE

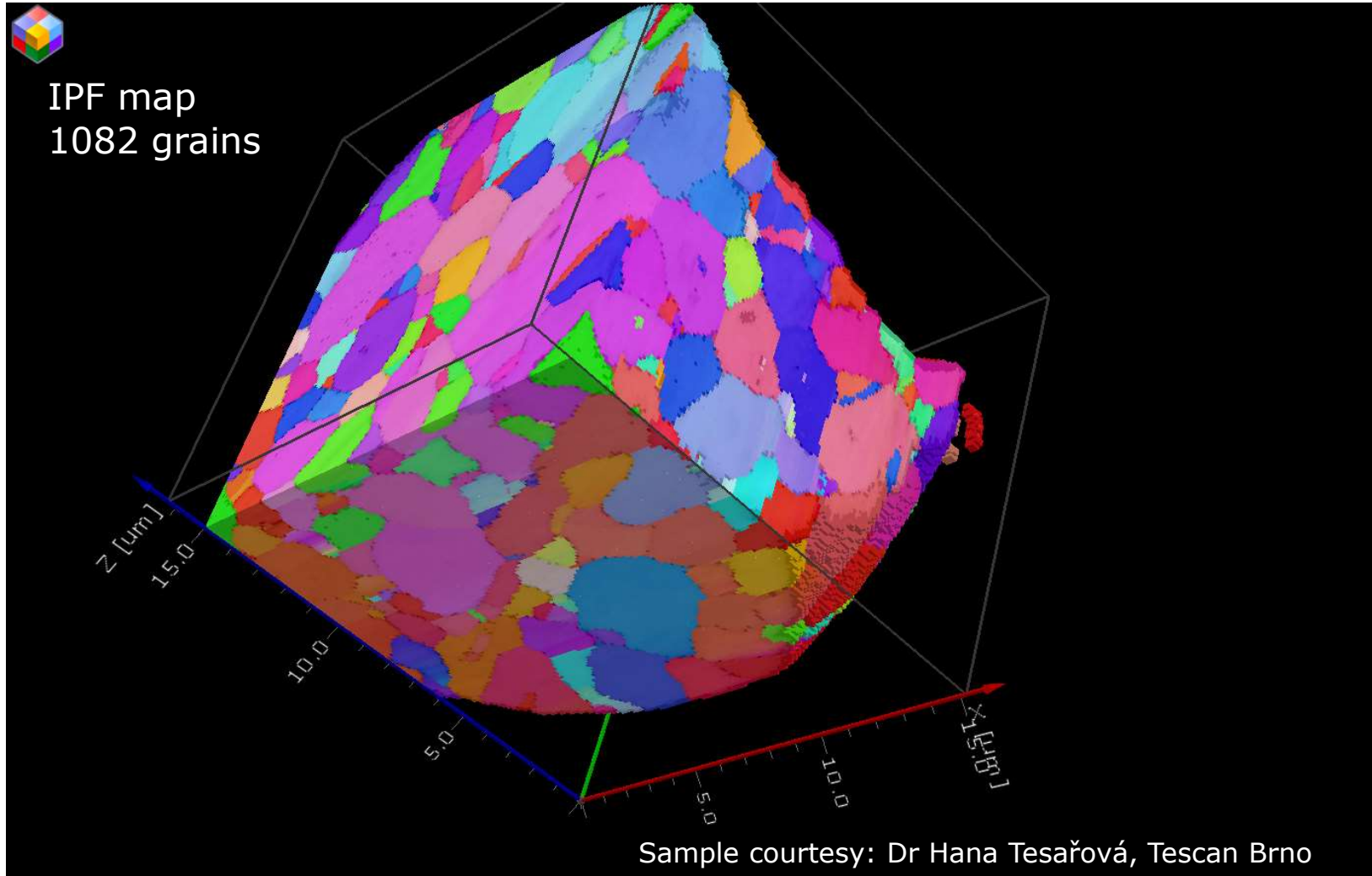
Grain Boundary network – PbSn powder metallurgy (solder ball) acquired with static 3D EBSD (Tescan)



Sample courtesy: Dr Hana Tesařová, Tescan Brno

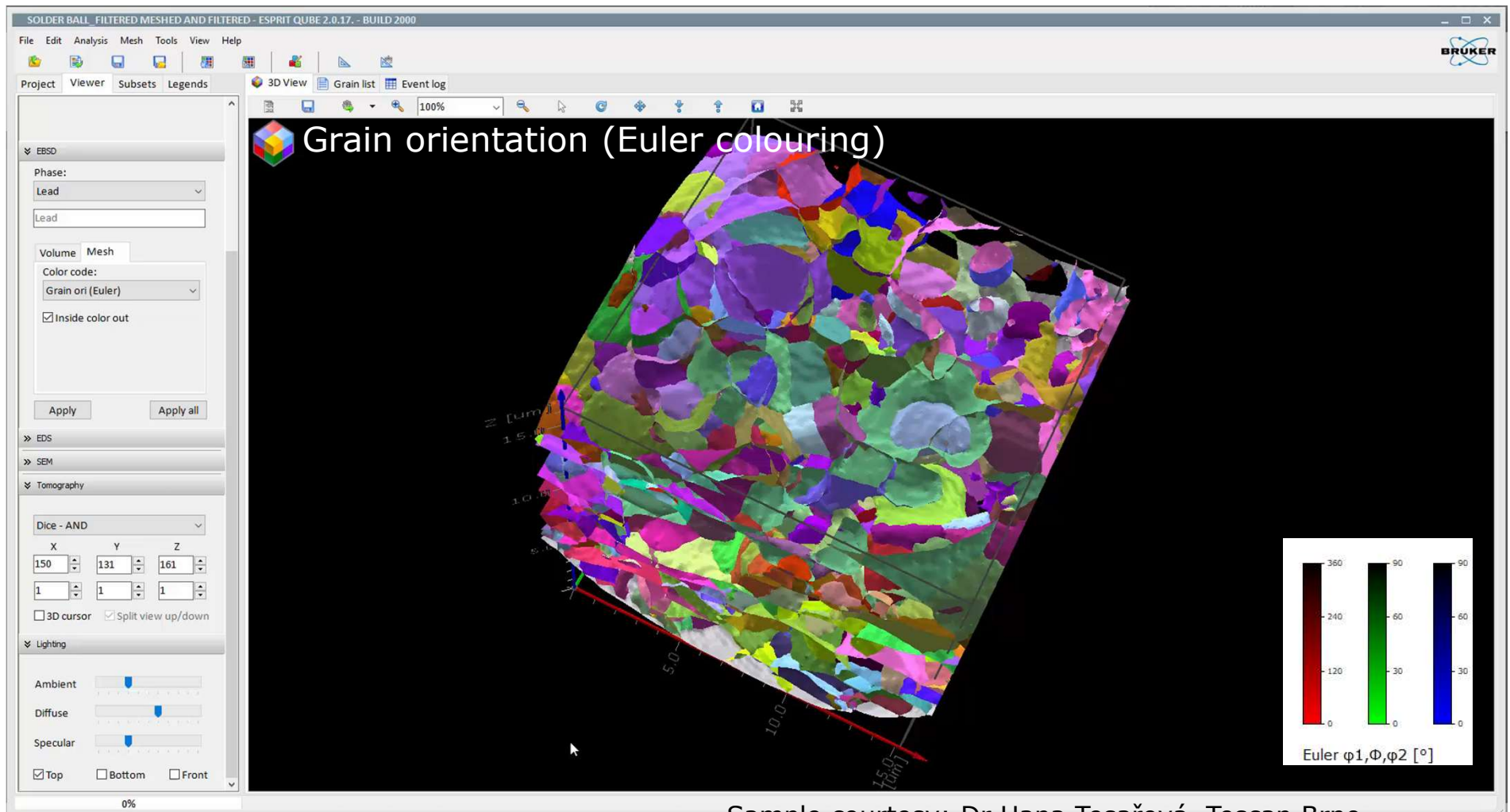
# ESPRIT QUBE

Grain Boundary network  
PbSn powder metallurgy



# ESPRIT QUBE

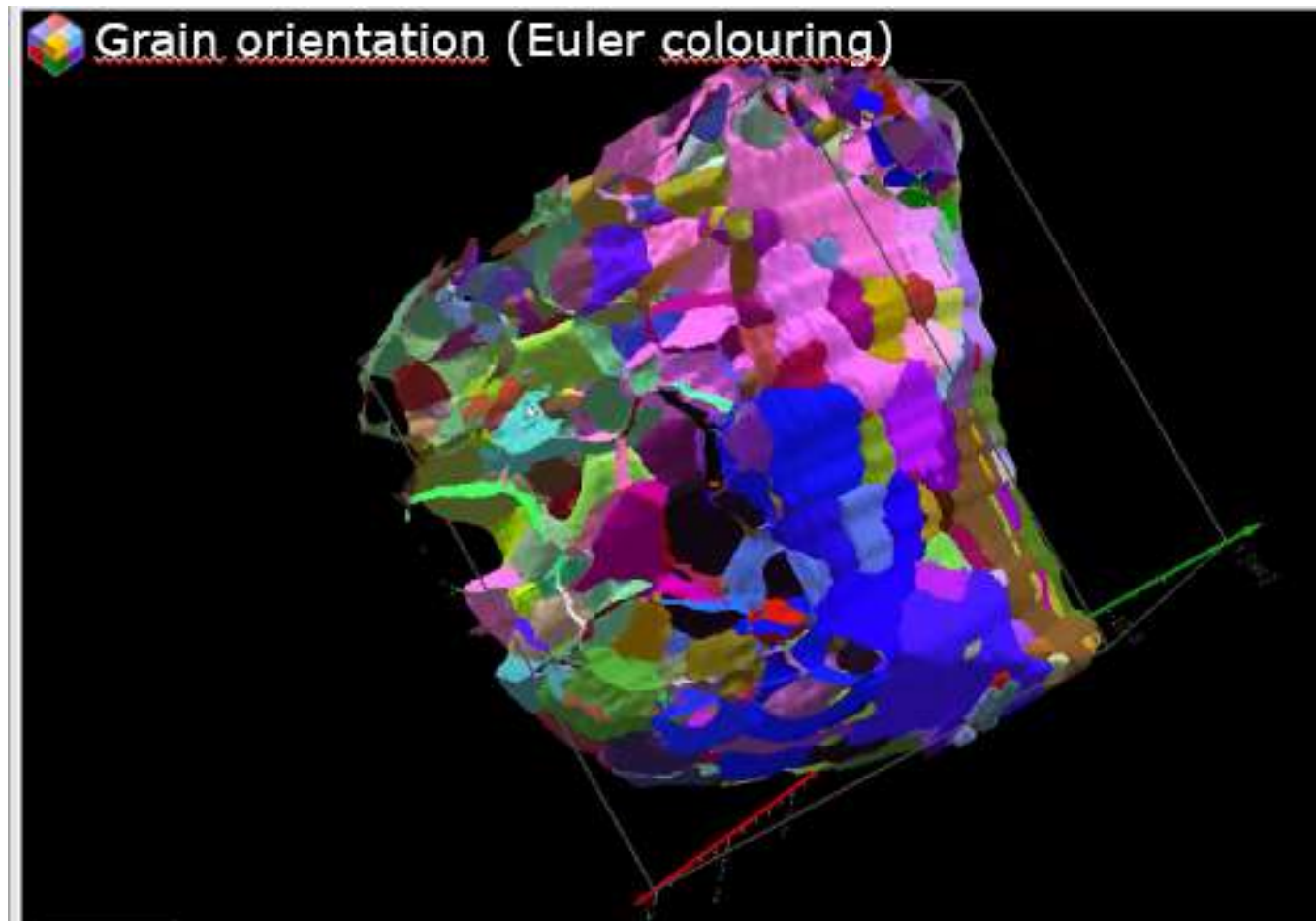
## Grain Boundary network PbSn powder metallurgy



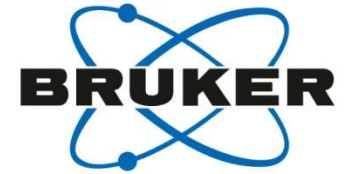


# ESPRIT QUBE

Grain Boundary network  
PbSn powder metallurgy



Sample courtesy: Dr Hana Tesařová, Tescan Brno



Analysis of 3D tomographic datasets with  
ESPRIT QUBE



# ESPRIT QUBE

## Outline



- Introduction
- Data files
- Viewing and navigation
- Filters and geometry
- Analytical tools
- Subsets
- Surface meshes
- Data synergy
- Data monitoring

# ESPRIT QUBE

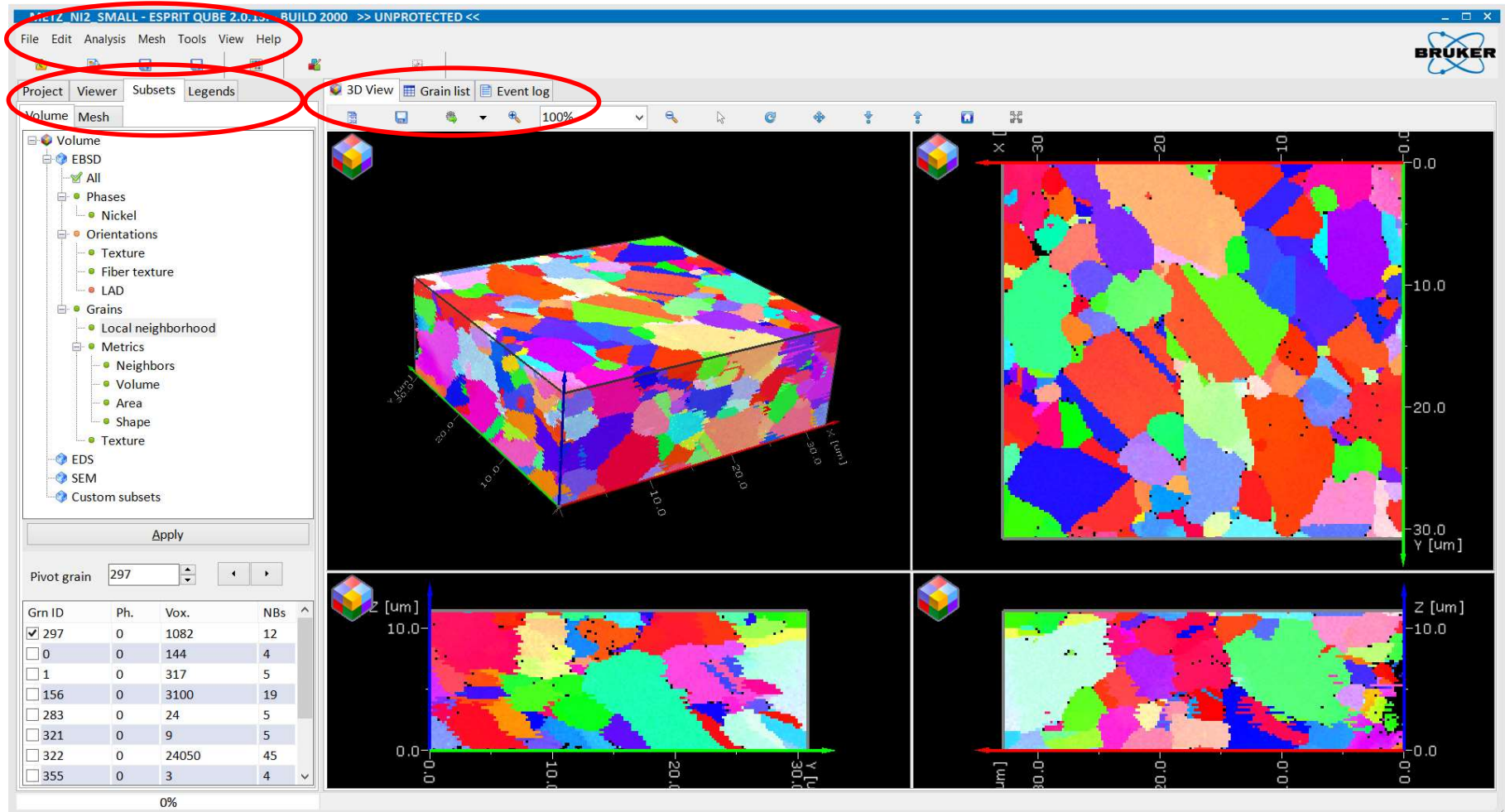
## Introduction 1(2)



*What is QUBE ?*

- Reconstruction of tomographic data sets from analytical SEM
- Tailored for surface characterization techniques such as EBSD and EDS
- Integrative analysis of 3D data sets
- Customizable interactive processing pipeline
- Multimodal data sets

# ESPRIT QUBE Introduction 2(2)



Data set: courtesy of Dr. Nathalie Gey, LEM3

# ESPRIT QUBE

## Data types and formats

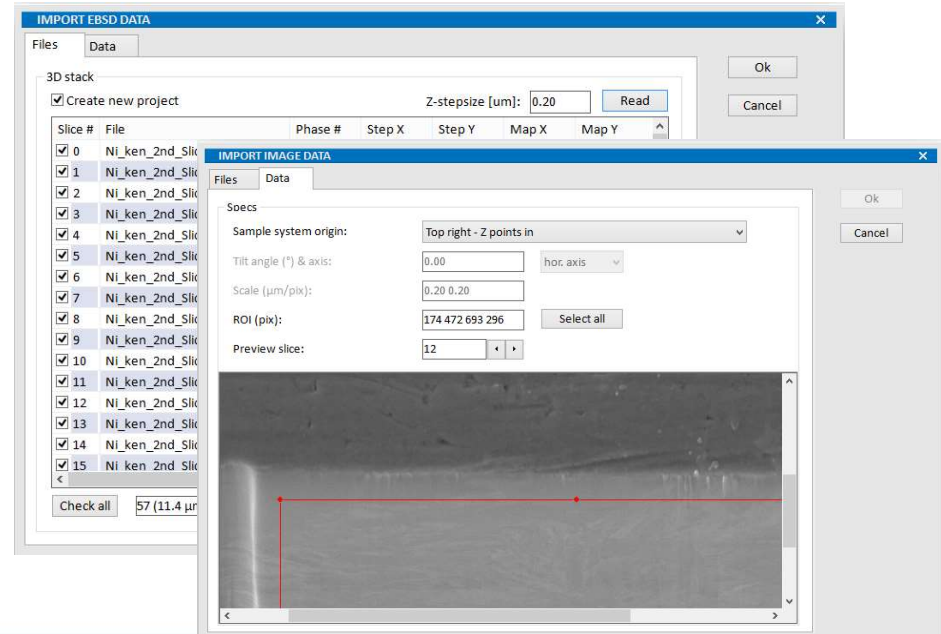


### *Import data sets:*

- Import of 2D slices, per data set
- EBSD: Bruker format (.bcf) and other common formats (e.g .ctf, .ang)
- EDS: Bruker (.bcf) (counts or conc.), as well as (.txt) files
- SEM Images: common bitmap formats (.bmp, .gif, .png, .jpg, etc)

### *Qube projects:*

- All 3 data types are saved into a single 3D project (.qml)
- .vti export
- Export of images, lists and intermediate results



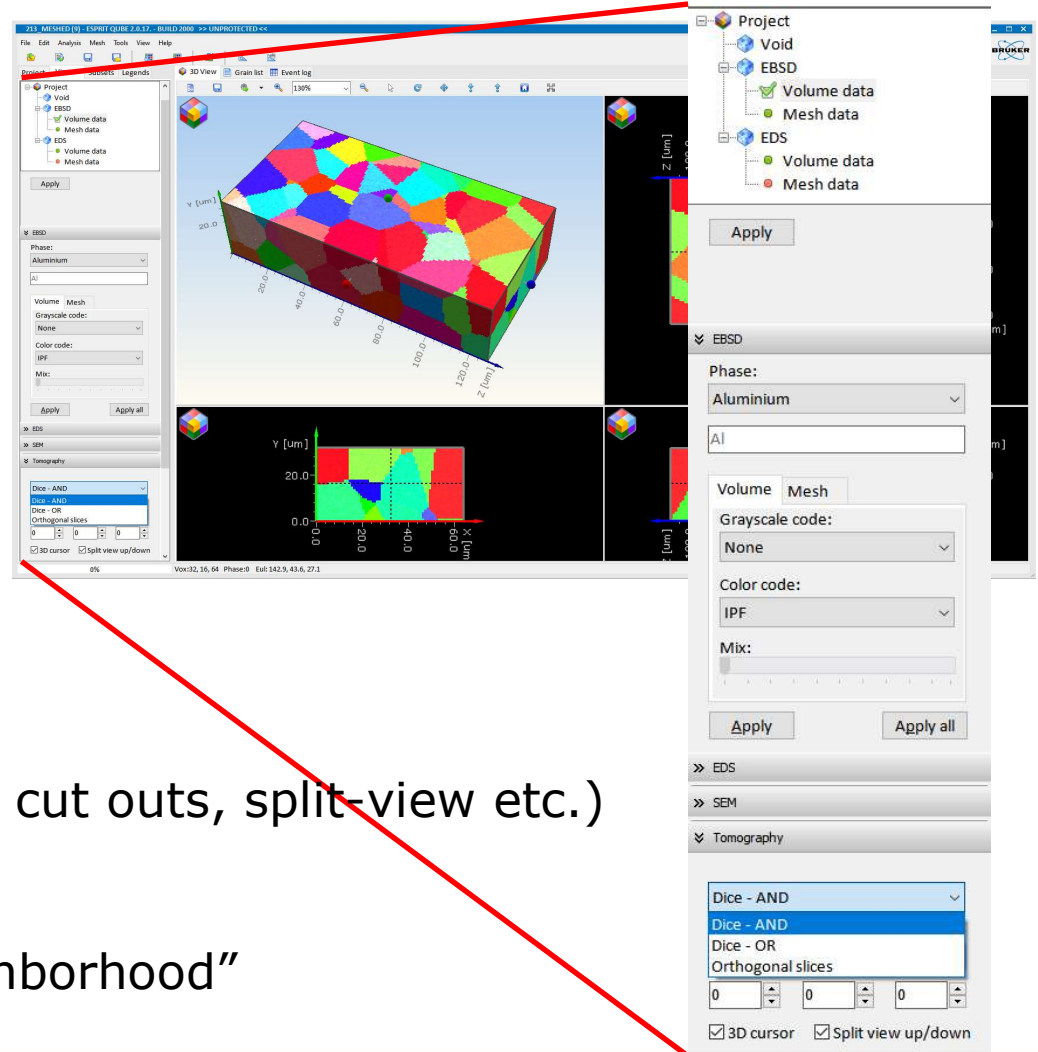
# ESPRIT QUBE

## Viewing & navigation



### Viewing:

- “Real time” (wysiwyg)
- Extensive dedicated color codes for EBSD, EDS and bitmaps
- Semi transparency (scalar data)
- Multimodal views options



### Navigation by:

- “Real time” (wysiwyg)
- Slice-wise: tomography (slicing, cut outs, split-view etc.)
- Voxel-wise: 3D cursor
- Segmentation-wise: “grain neighborhood”



Apply

EBSD

Phase:  
Aluminium

Al

Volume Mesh

Grayscale code:  
None

Color code:  
IPF

Mix:

Apply Apply all

EDS

SEM

Tomography

Dice - AND

X	Y	Z
63	31	127
0	0	0

3D cursor  Split view up/down

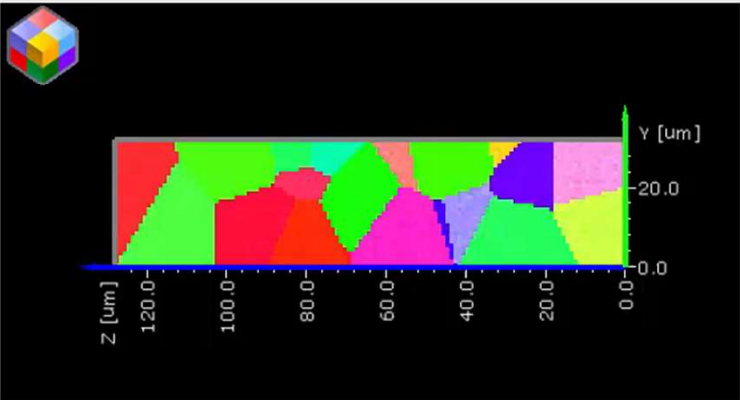
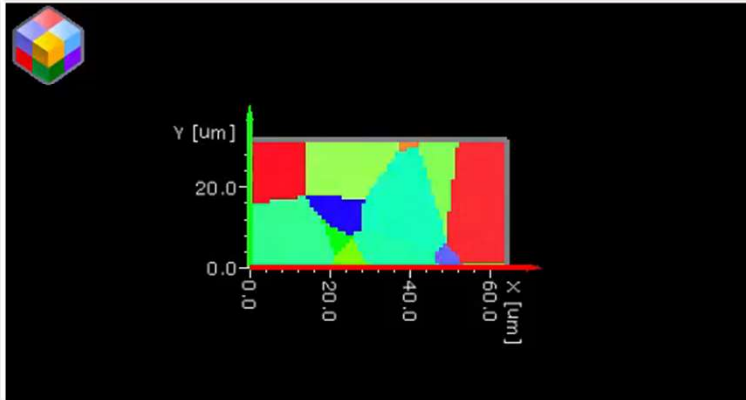
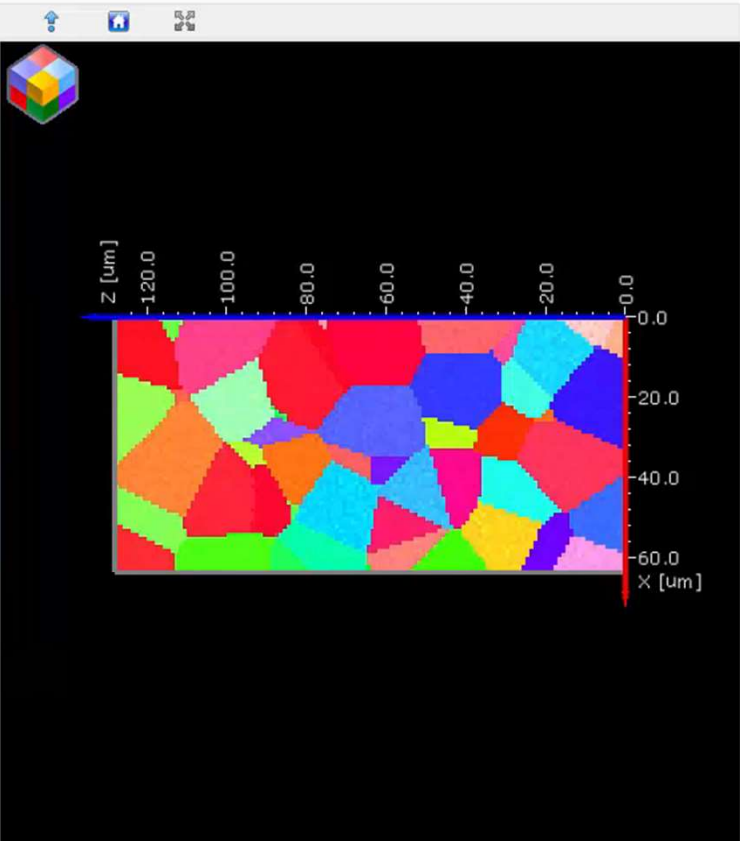
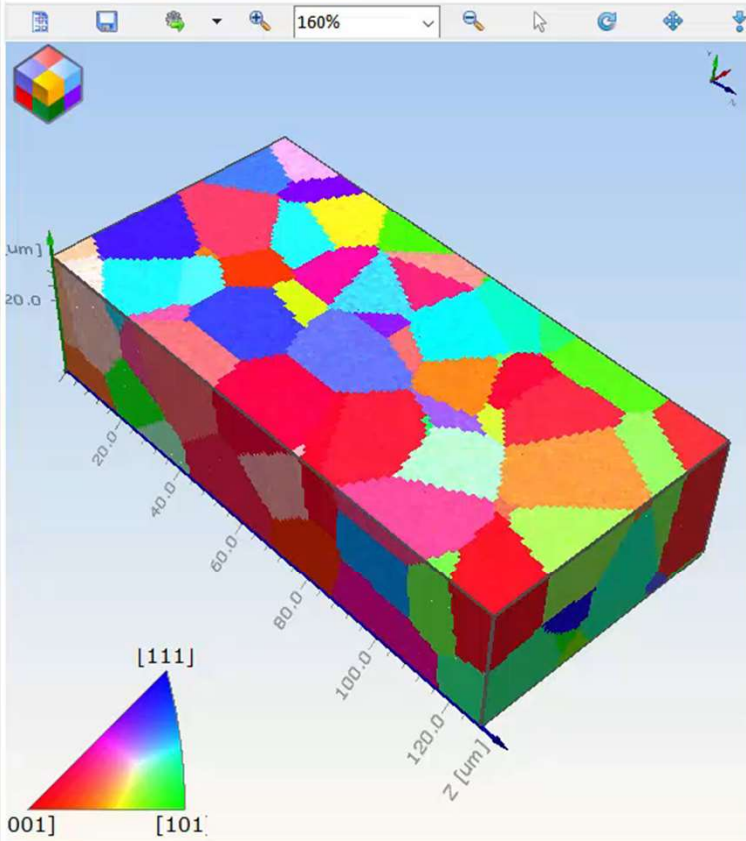
Lighting

Ambient

Diffuse

Specular

Top  Bottom  Front





213\_MESHED (9) - ESPRIT QUBE 2.0.17. - BUILD 2000 >> UNPROTECTED <<

File Edit Analysis Mesh Tools View Help

Project Viewer Subsets Legends 3D View Grain list Event log

Apply

EBSD

Phase: Aluminium

Al

Volume Mesh

Grayscale code: None

Color code: LAD

Mix:

Apply Apply all

EDS

SEM

Tomography

Dice - AND

X Y Z

63 31 127

0 0 0

3D cursor  Split view up/down

Lighting

Ambient

Diffuse

Specular

Top  Bottom  Front

VOLUME COLOR CODE

GND (LAD)		Schmid		EDS	
Phase	Pattern	Euler	IPF	LAD	
Show					
Min [°]	1		↓		
Max [°]	2.69		↑		
Color					
Color scheme	Msh blue to red		↓		
Opacity	Inc. with scalar		↔		
Out-of-range	Custom...		↓		<input type="checkbox"/> Show

Ok Cancel

213\_MESHED (9) - ESPRIT QUBE 2.0.17. - BUILD 2000 >> UNPROTECTED <<

File Edit Analysis Mesh Tools View Help

Project Viewer Subsets Legends 3D View Grain list Event log

Apply

EBSD

Phase: Aluminium

Al

Volume Mesh

Grayscale code: None

Color code: IPF

Mix:

Apply Apply all

EDS

SEM

Tomography

Orthogonal slices

X	Y	Z
26	9	73

Snap 3D cursor

3D cursor  Split view up/down

Lighting

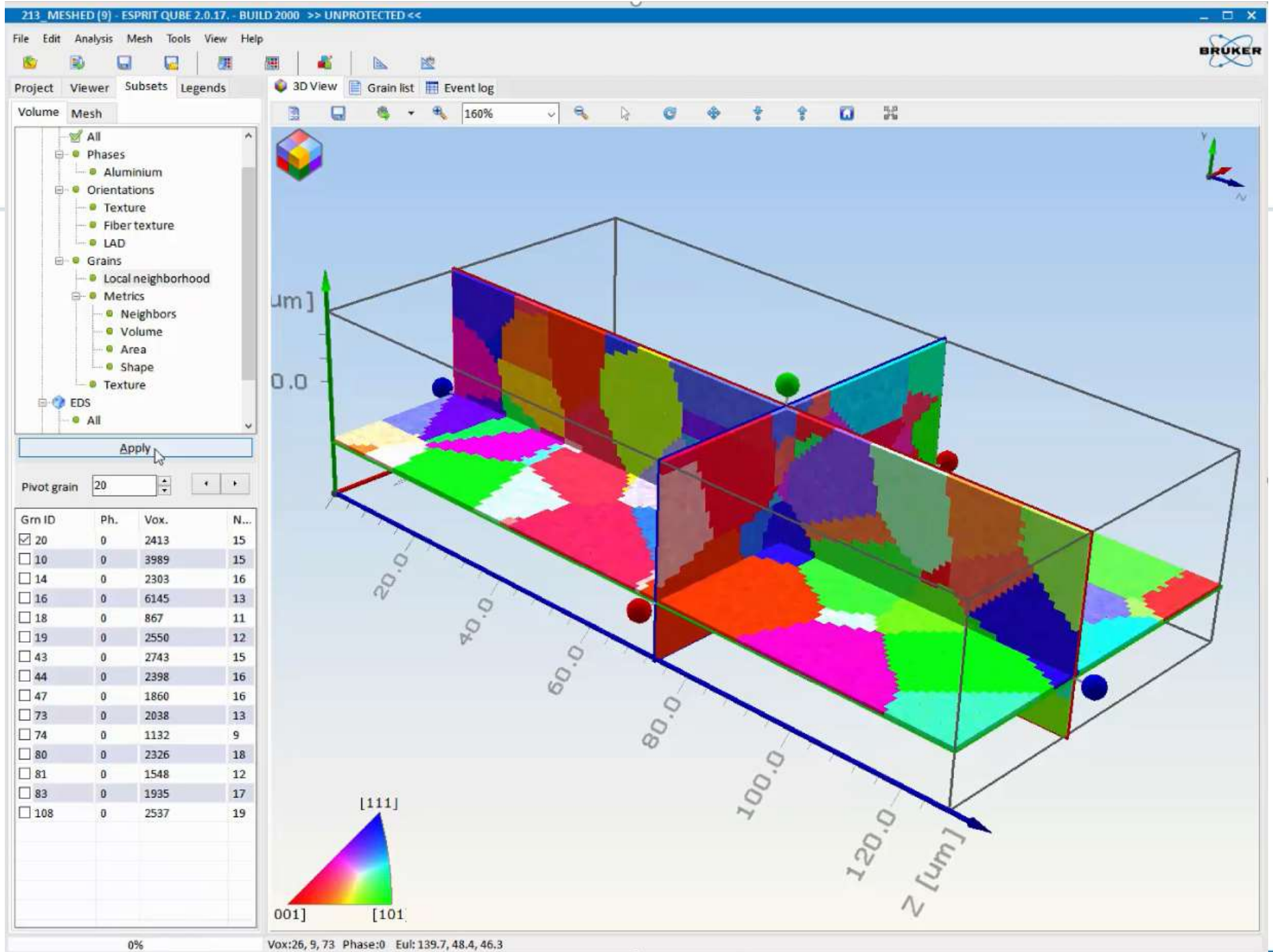
Ambient

Diffuse

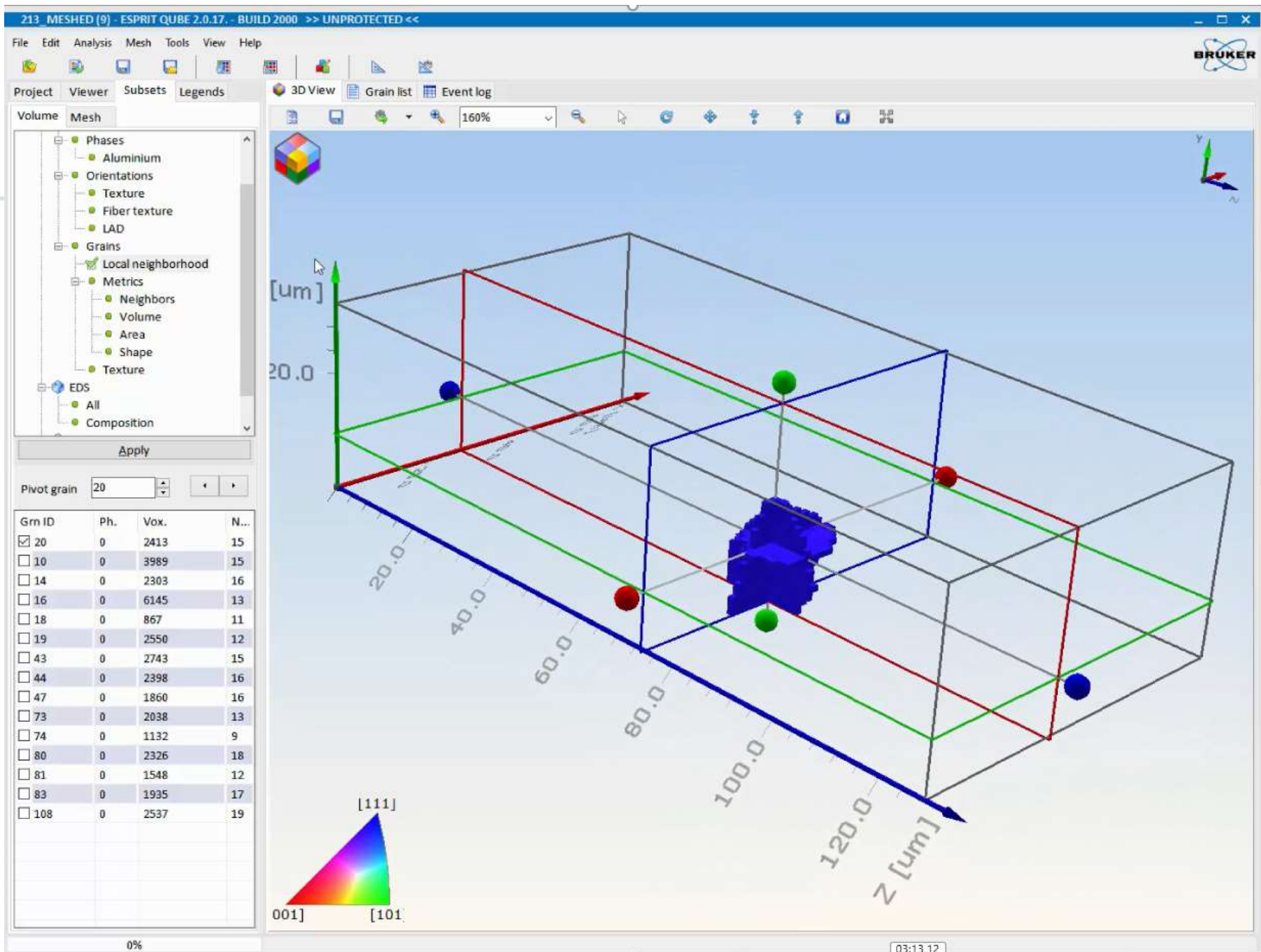
Specular

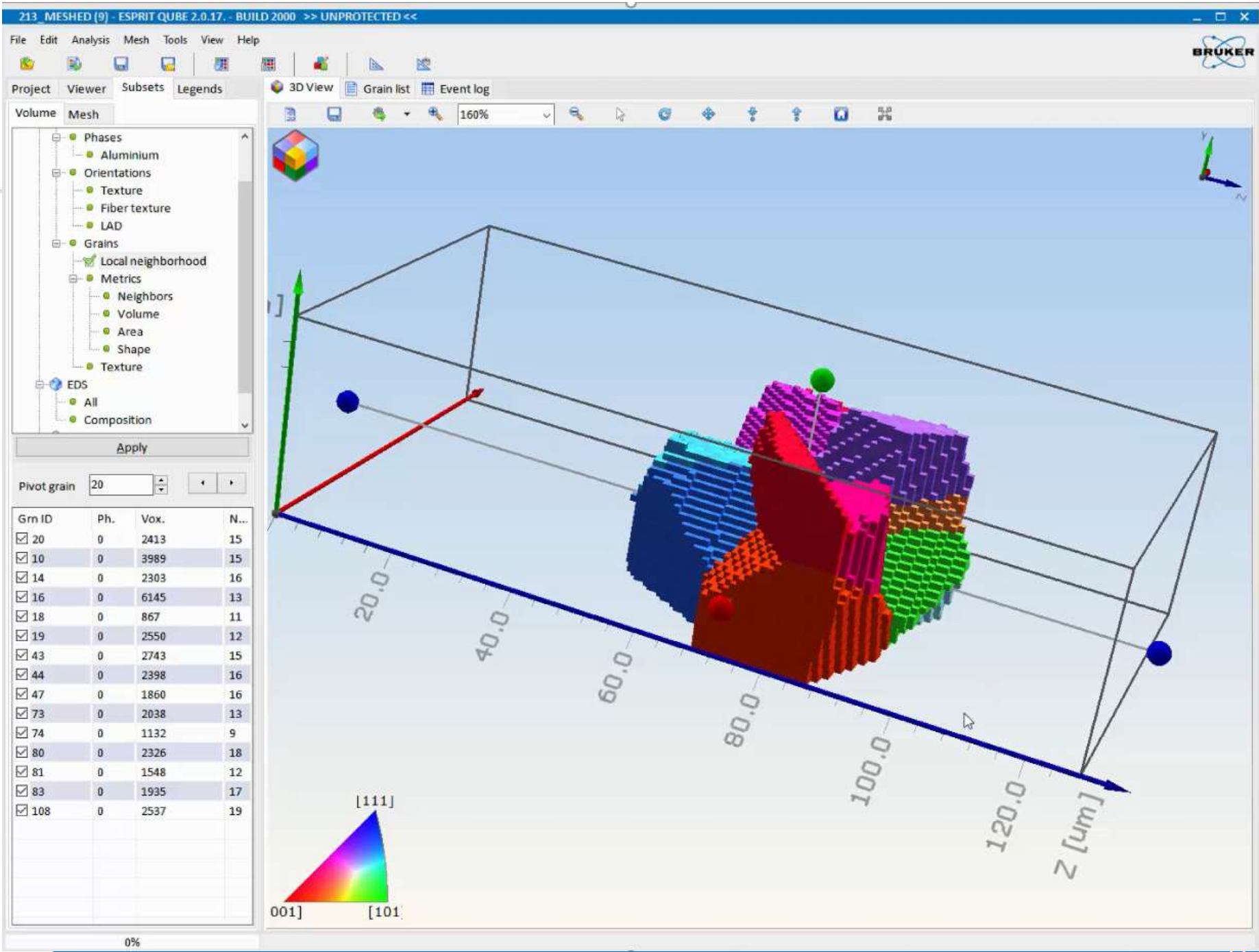
Top  Bottom  Front

0%









# ESPRIT QUBE

## Filters and geometry

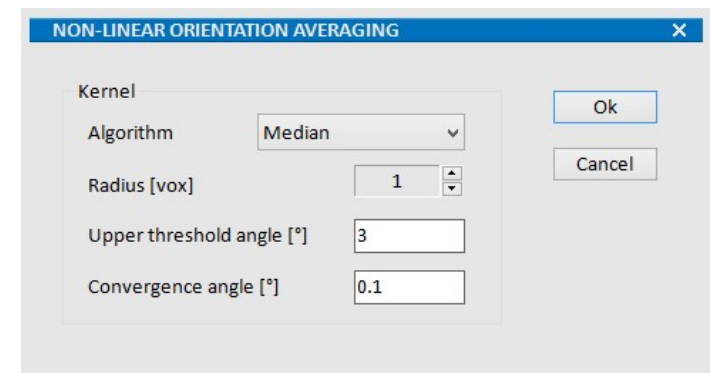
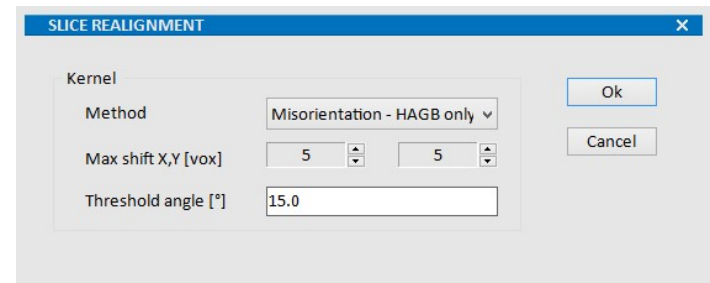


### *Geometry editing:*

- Cropping and slice deletion
- Slice registration
- Affects EBSD, EDS and SEM data sets

### *Data filtering:*

- Currently for EBSD (limited for EDS)
- Linear filters (Gaussian, box)
- Non-linear filters (Kuwahara, median)
- Despeckling (outliers)
- Clean up (stray voxels)





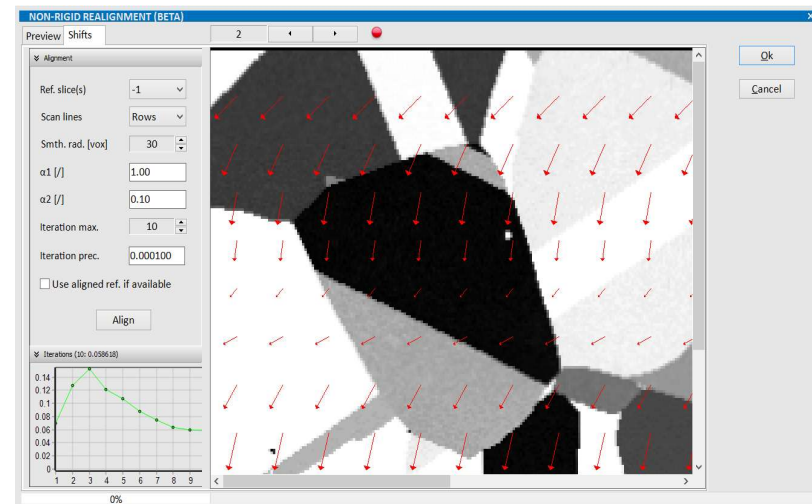
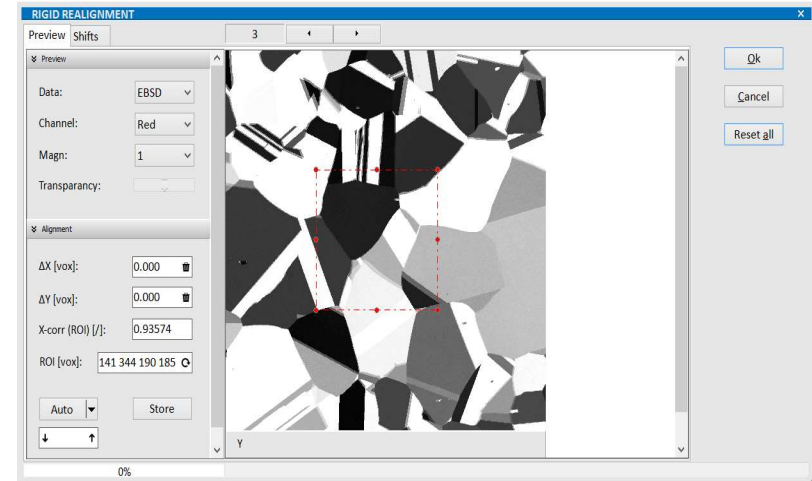
# ESPRIT QUBE

## Slice registration



### *Slice registration:*

- Rigid realignment (manually)
- Rigid realignment (EBSD based)
- Non rigid realignment (Constrained smart align)
- Affects EBSD, EDS and SEM data sets



## Analysis of EBSD data:

- Grain segmentation (extensive EBSD grain list)

### GRAIN RECONSTRUCTION

Segmentation

Critical disorientation angle [°]:

Next neighbors to consider:

GB to disregard

#	Phase	Axis	Angle [°]	Deviation [°]
1	0	1 1 1	60.00	8.6

Buttons: Add..., Edit..., Delete

### FILTER GRAIN LIST

Filter settings

Grain volume <= [vox]:

Clean-up action:

Set to non-indexed, if no s...

Buttons: Ok, Cancel

Volume [vox.]

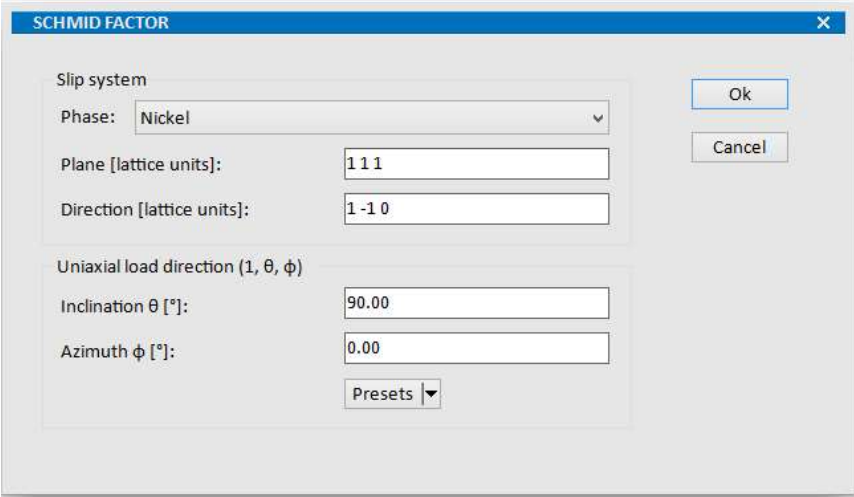
ID	Phase	Ori. mean [Re Im]	Ori. variance	Volume [vox.]	Surface [µm²]	CMS [µm]	NeL...	Bot...	Ellipsoid [µm]	Ellipsoid vol...	Ellipsoid surface [µm²]
0	0	0.98 0.12 0.07 -0.12	0.0000	38	2.20	3.34 0.22 0.28	4	1	0.76 0.35 0.29	0.32	2.56
1	0	0.94 -0.23 0.24 0.06	0.0000	104	4.64	5.87 0.35 0.43	7	1	0.87 0.54 0.46	0.92	4.80
2	0	0.96 0.17 -0.20 0.06	0.0000	25	2.60	6.65 0.37 0.37	5	1	0.60 0.46 0.18	0.21	2.14
3	0	0.93 0.06 0.26 0.25	0.0000	300	10.68	12.03 1.14 0.24	10	1	1.45 1.39 0.32	2.74	14.50
4	0	0.90 -0.28 0.15 -0.00	0.0000	42	2.72	17.21 0.21 0.17	8	1	1.81 0.29 0.25	0.55	4.83
5	0	0.91 -0.02 0.33 -0.00	0.0000	418	14.24	20.15 1.27 0.29	10	1	1.58 1.40 0.43	3.98	16.28
6	0	0.90 -0.34 0.04 -0.00	0.0000	1323	51.40	23.44 2.60 0.56	16	1	2.99 2.13 0.50	13.26	44.13
7	0	0.98 -0.17 -0.03 0.00	0.0000	375	8.00	24.15 1.21 0.16	5	1	1.47 1.28 0.19	1.47	12.23
8	0	0.91 -0.21 0.35 0.05	0.0001	800	20.00	27.01 1.10 0.43	10	1	2.39 1.93 0.52	6.91	23.82
9	0	0.93 -0.15 -0.34 0.00	0.0001	3270	60.36	32.73 2.67 1.01	17	1	3.66 3.75 1.32	35.31	59.04
10	0	0.94 -0.01 -0.14 0.00	0.0008	3177	71.28	7.63 2.33 0.42	32	1	4.45 3.01 0.65	36.35	91.75
11	0	0.93 0.04 0.20 -0.29	0.0000	561	18.00	14.10 1.64 0.56	8	1	1.48 1.03 0.79	5.03	14.94
12	0	0.95 -0.20 0.15 -0.00	0.0002	203	7.20	0.49 2.15 0.43	3	1	1.10 0.80 0.54	2.01	8.23
13	0	0.90 0.32 -0.24 -0.00	0.0000	41	3.08	11.84 3.56 0.15	10	1	0.97 0.50 0.17	0.36	3.57
14	0	0.92 -0.25 -0.23 0.00	0.0000	7	0.76	12.24 2.67 0.10	5	1	0.40 0.28 0.00	0.00	0.70
15	0	0.93 0.00 0.16 -0.33	0.0001	1526	42.24	16.25 2.77 0.42	20	1	3.25 2.07 0.62	17.35	48.14
16	0	0.97 -0.01 -0.12 0.00	0.0000	215	9.16	20.59 3.63 0.27	7	1	1.24 1.01 0.39	2.05	9.73
17	0	0.97 0.17 -0.17 -0.00	0.0008	66	4.92	22.87 4.36 0.14	7	1	1.16 0.78 0.16	0.62	6.21
18	0	0.96 0.04 -0.07 0.27	0.0000	51	3.36	12.38 4.48 0.17	8	1	0.89 0.55 0.21	0.44	3.68
19	0	0.96 -0.07 0.14 -0.00	0.0001	2688	64.44	2.36 8.06 0.88	12	1	3.01 2.43 0.90	27.62	55.87
20	0	0.90 0.28 0.02 0.33	0.0001	12	1.44	7.20 6.00 0.13	6	1	0.77 0.24 0.11	0.09	1.40
21	0	0.99 -0.08 0.05 -0.00	0.0000	1769	45.92	8.92 7.89 0.85	14	1	2.26 1.72 1.03	16.73	34.51
22	0	0.92 0.00 0.35 -0.20	0.0000	15	1.40	10.29 6.01 0.19	6	1	0.57 0.45 0.00	0.00	1.62
23	0	0.94 -0.27 0.21 0.00	0.0000	150	7.24	17.91 7.67 0.25	10	1	1.37 0.70 0.33	1.32	7.51
24	0	0.92 0.21 -0.09 0.33	0.0000	2463	66.04	11.90 8.73 0.56	24	1	3.60 2.43 0.92	33.83	65.99
25	0	0.91 -0.11 -0.23 0.00	0.0024	460	18.68	15.78 7.26 0.42	10	1	1.95 0.95 0.62	4.79	16.11
26	0	0.92 -0.33 0.19 0.13	0.0000	516	21.44	15.15 8.26 0.68	9	1	1.66 1.07 0.63	4.68	15.31
27	0	0.95 0.00 -0.10 -0.00	0.0000	1041	33.28	33.82 11.08 1.05	22	1	3.73 1.60 0.96	14.05	43.23
28	0	0.98 -0.32 -0.21 0.00	0.0000	1225	34.80	30.07 9.90 0.47	12	1	2.95 1.48 0.66	12.01	33.53
29	0	0.94 -0.10 -0.06 0.00	0.0000	5	8.60	1.94 8.78 0.10	6	1	0.00 0.00 0.00	0.00	0.00
30	0	0.90 -0.27 0.34 0.07	0.0000	45	3.32	1.74 9.37 0.16	5	1	0.87 0.56 0.20	0.40	3.59
31	0	0.98 -0.14 0.02 -0.00	0.0003	4509	101.24	5.92 10.88 0.42	22	1	5.63 3.15 0.66	49.01	120.15
32	0	0.94 -0.10 -0.06 0.00	0.0000	1901	47.52	1.50 11.57 0.93	10	1	2.14 1.91 1.08	18.43	36.46
33	0	0.93 -0.01 -0.36 0.00	0.0001	686	25.16	15.64 12.31 0.42	11	1	2.04 1.45 0.60	7.37	22.87
34	0	0.98 -0.10 0.01 -0.00	0.0000	63	4.36	8.24 11.60 0.29	3	1	0.74 0.53 0.33	0.54	3.51
35	0	0.93 -0.20 0.17 0.00	0.0000	79	6.32	32.50 11.52 0.34	6	1	1.14 0.56 0.30	0.80	5.35
36	0	0.91 0.02 0.31 -0.27	0.0000	448	24.60	21.74 13.37 0.22	10	1	4.03 1.06 0.27	4.91	29.31
37	0	0.93 0.11 0.16 0.00	0.0000	1763	47.63	16.64 13.36 0.36	8	1	2.93 1.08 0.65	11.01	37.16

### *Analysis of EBSD data:*

- Grain segmentation (extensive EBSD grain list)
- Local average disorientation (LAD)
- Approximated GND density (based on LAD)
- Schmid factor
- Various subsets

### *Analysis of EDS data:*

- Subsets



SCHMID FACTOR

Slip system

Phase: Nickel

Plane [lattice units]: 1 1 1

Direction [lattice units]: 1 -1 0

Uniaxial load direction (1,  $\theta$ ,  $\phi$ )

Inclination  $\theta$  [°]: 90.00

Azimuth  $\phi$  [°]: 0.00

Presets

Ok

Cancel

# ESPRIT QUBE

## Subsets

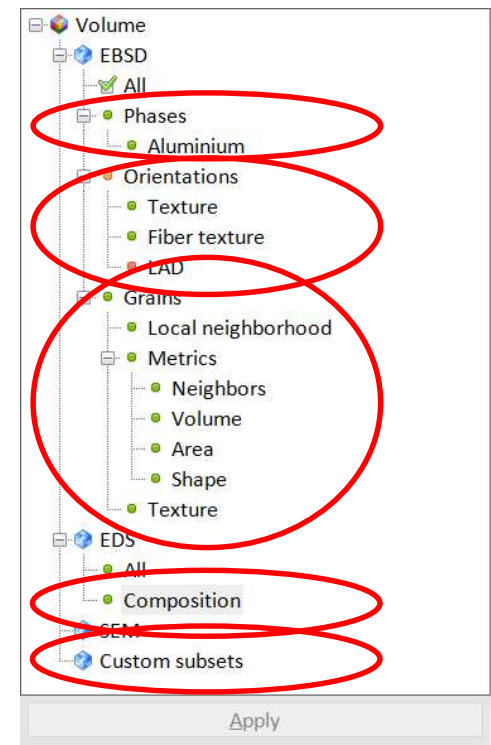


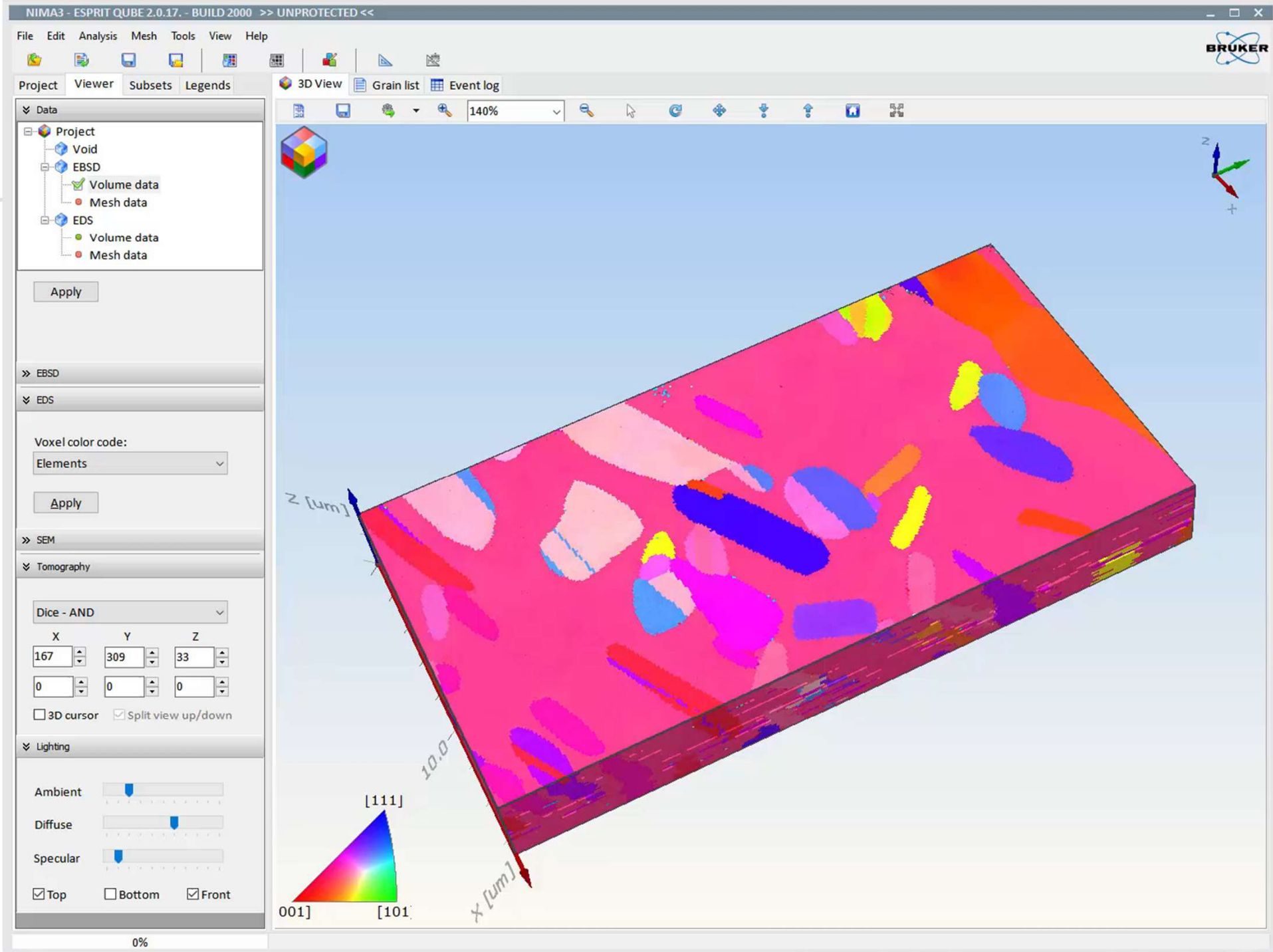
### *EBSD volume subset options:*

- Predefined subsets: phases, textures, LAD, grain metrics, grain texture, grain selections
- Custom subsets
- Subsets can be exported and imported
- Subsets can be applied across data sets (e.g. apply EBSD subset to EDS data set)

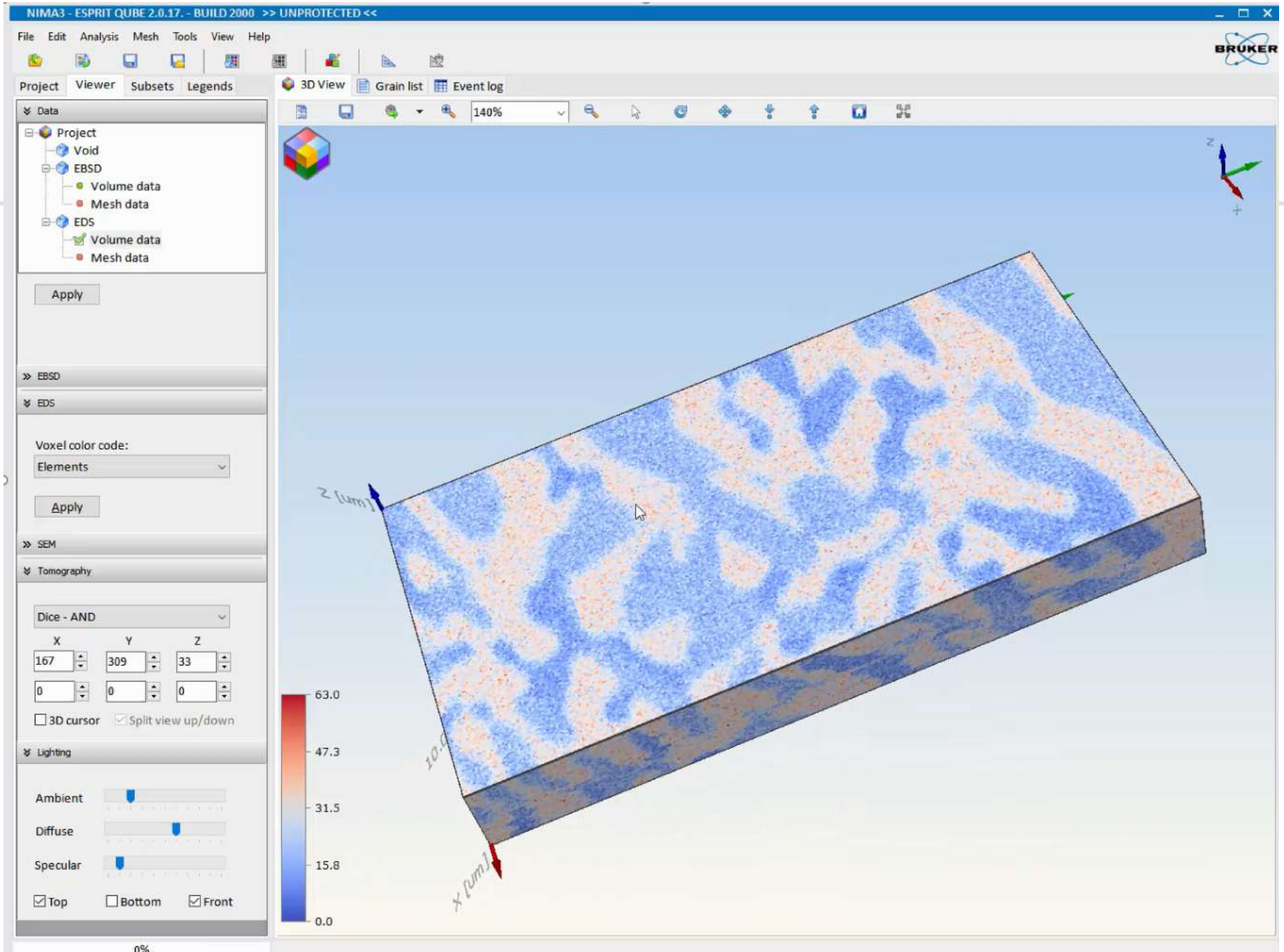
### *EDS volume subset options:*

- Compositional subsets (user defined, picked from position or from .cif)











NIMA3 - ESPRIT QUBE 2.0.17. - BUILD 2000 >> UNPROTECTED <<

File Edit Analysis Mesh Tools View Help

Project Viewer Subsets Legends 3D View Grain list Event log

**Data**

- Project
  - Void
  - EBSD
    - Volume data
    - Mesh data
  - EDS
    - Volume data
    - Mesh data

Apply

---

EBSD

EDS

Voxel color code:  
Elements

Apply

---

SEM

Tomography

Dice - AND

X: 167 Y: 309 Z: 33

0 0 0

3D cursor  Split view up/down

---

Lighting

Ambient

Diffuse

Specular

Top  Bottom  Front

ID	Phase	Ori. mean [Re Im]	Ori. variance	Volume [vox]	Surface [um <sup>2</sup> ]	CMS [um]	Nei...	Bor...	Ellipsoid [um]	Ellipsoid vol...	Ellip...
2317	1	0.73 -0.37 -0.38 -0...	0.0000	1	0.06	4.05 9.35 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2314	0	0.51 0.61 0.16 0.58	0.0000	1	0.06	13.25 9.15 2.15	5	0	0.00 0.00 0.00	0.00	0.00
2313	0	0.74 -0.37 -0.38 -0...	0.0000	1	0.06	5.45 9.15 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2321	0	0.08 -0.09 -0.67 -0...	0.0000	1	0.06	4.65 9.55 2.15	5	0	0.00 0.00 0.00	0.00	0.00
2319	0	0.26 0.29 -0.88 -0...	0.0000	1	0.06	4.85 9.45 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2318	0	0.40 -0.58 -0.46 0...	0.0000	1	0.06	4.15 9.35 2.15	5	0	0.00 0.00 0.00	0.00	0.00
2309	0	0.28 -0.92 0.12 -0...	0.0000	1	0.06	2.35 9.15 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2308	1	0.56 0.79 0.04 0.24	0.0000	1	0.06	5.65 9.05 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2306	0								0.00 0.00 0.00	0.00	0.00
2312	1								0.00 0.00 0.00	0.00	0.00
2311	0								0.00 0.00 0.00	0.00	0.00
2310	0								0.00 0.00 0.00	0.00	0.00
2322	0								0.00 0.00 0.00	0.00	0.00
2334	1								0.00 0.00 0.00	0.00	0.00
2333	1								0.00 0.00 0.00	0.00	0.00
2332	0								0.00 0.00 0.00	0.00	0.00
2337	0								0.00 0.00 0.00	0.00	0.00
2336	0								0.00 0.00 0.00	0.00	0.00
2335	0								0.00 0.00 0.00	0.00	0.00
2326	1								0.00 0.00 0.00	0.00	0.00
2325	0								0.00 0.00 0.00	0.00	0.00
2324	0								0.00 0.00 0.00	0.00	0.00
2330	1								0.00 0.00 0.00	0.00	0.00
2328	1								0.00 0.00 0.00	0.00	0.00
2327	0								0.00 0.00 0.00	0.00	0.00
2304	0								0.00 0.00 0.00	0.00	0.00
2285	1								0.00 0.00 0.00	0.00	0.00
2283	0								0.00 0.00 0.00	0.00	0.00
2281	0								0.00 0.00 0.00	0.00	0.00
2288	0	0.24 -0.53 0.64 0.51	0.0000	1	0.06	2.55 4.25 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2287	1	0.71 -0.41 0.39 -0...	0.0000	1	0.06	2.35 4.25 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2286	0	0.22 0.13 -0.51 -0...	0.0000	1	0.06	4.75 4.15 2.15	14	0	0.00 0.00 0.00	0.00	0.00
2275	0	0.12 0.05 -0.02 -0...	0.0000	1	0.06	0.25 3.45 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2274	0	0.84 -0.26 -0.47 0...	0.0000	1	0.06	5.45 3.35 2.15	5	0	0.00 0.00 0.00	0.00	0.00
2273	0	0.06 0.08 -0.97 -0...	0.0000	1	0.05	0.05 3.35 2.15	3	1	0.00 0.00 0.00	0.00	0.00
2279	0	0.11 0.00 0.06 -0.99	0.0000	1	0.06	5.15 3.75 2.15	5	0	0.00 0.00 0.00	0.00	0.00
2278	0	0.58 0.52 0.46 -0.42	0.0000	1	0.06	5.35 3.65 2.15	6	0	0.00 0.00 0.00	0.00	0.00
2277	0	0.58 -0.12 -0.62 0...	0.0000	1	0.06	0.35 3.55 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2289	0	0.39 -0.59 -0.46 0...	0.0000	1	0.06	3.85 4.25 2.15	4	0	0.00 0.00 0.00	0.00	0.00
2299	0	0.81 0.43 0.40 -0.02	0.0000	1	0.06	1.55 4.95 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2298	1	0.52 -0.84 -0.13 -0...	0.0000	1	0.06	1.85 4.75 2.15	3	0	0.00 0.00 0.00	0.00	0.00
2297	1	0.77 0.71 0.77 0.50	0.0000	1	0.06	5.15 4.55 2.15	5	0	0.00 0.00 0.00	0.00	0.00

**FILTER GRAIN LIST**

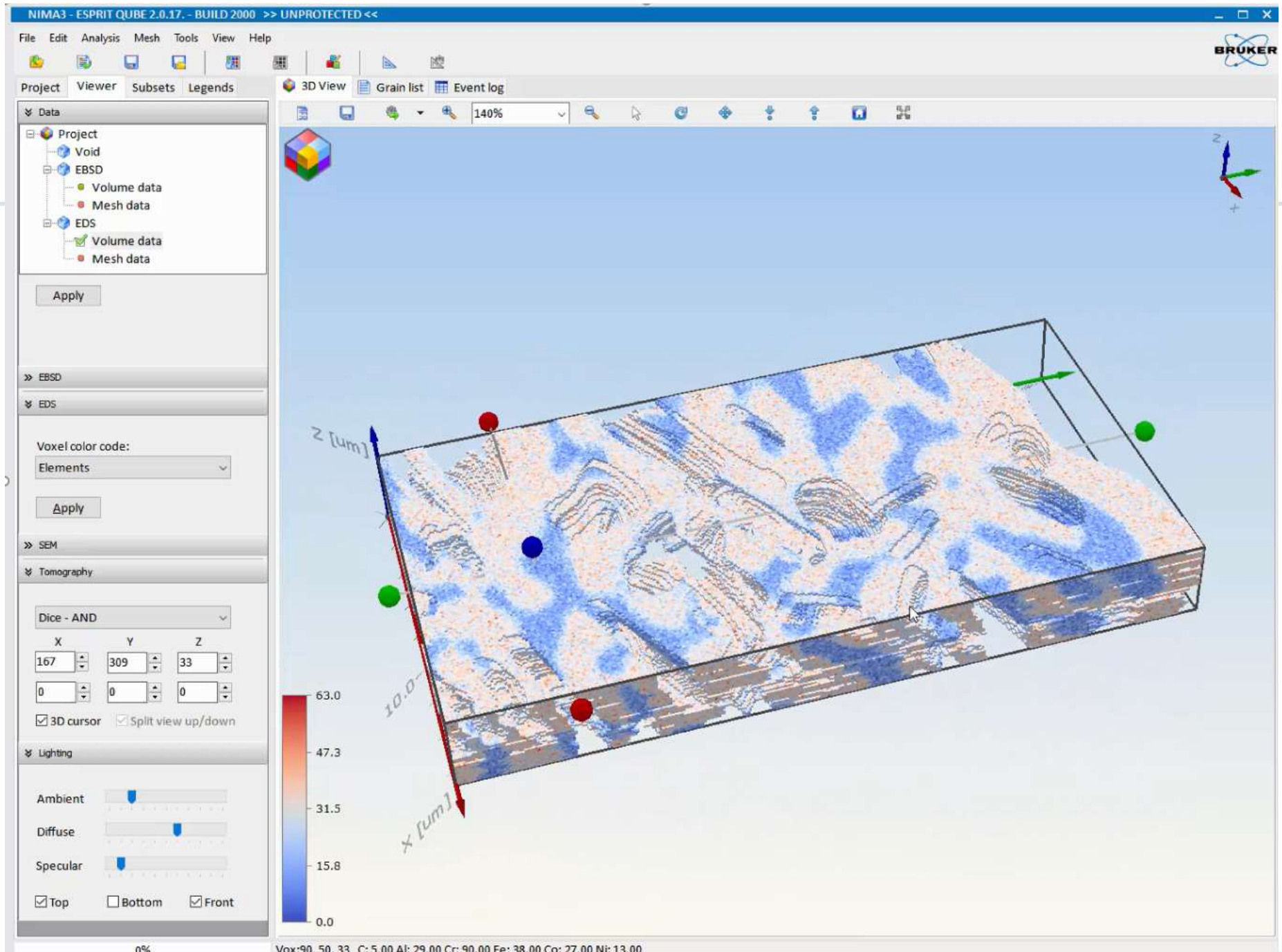
Filter settings

Grain volume <= [vox]:

Clean-up action:

Set to non-indexed, if no suitable neighbors available

Ok Cancel



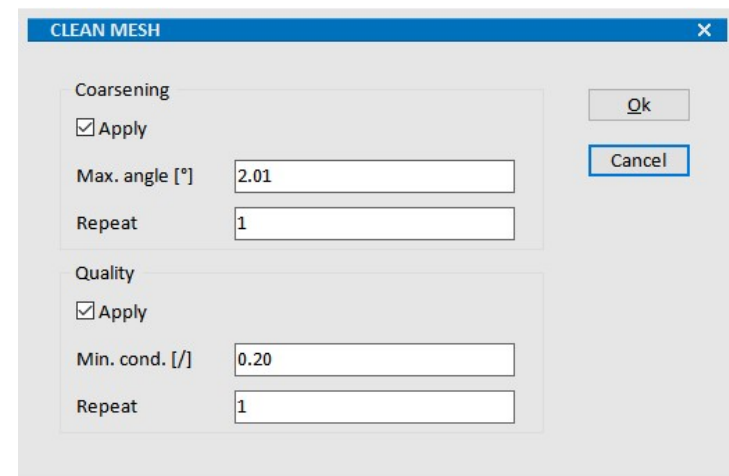
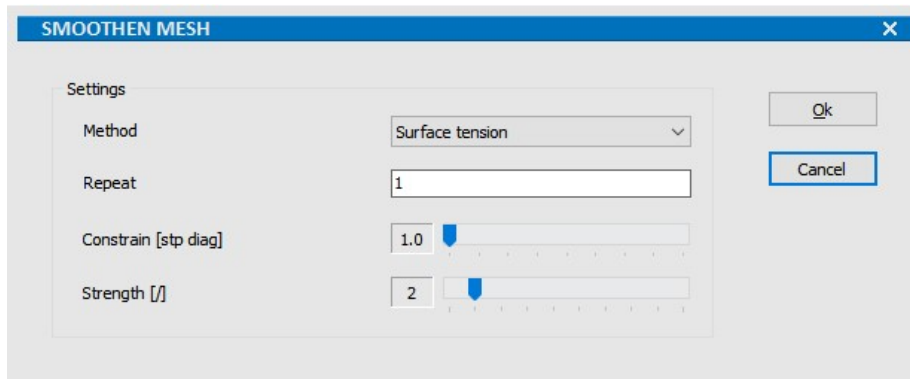
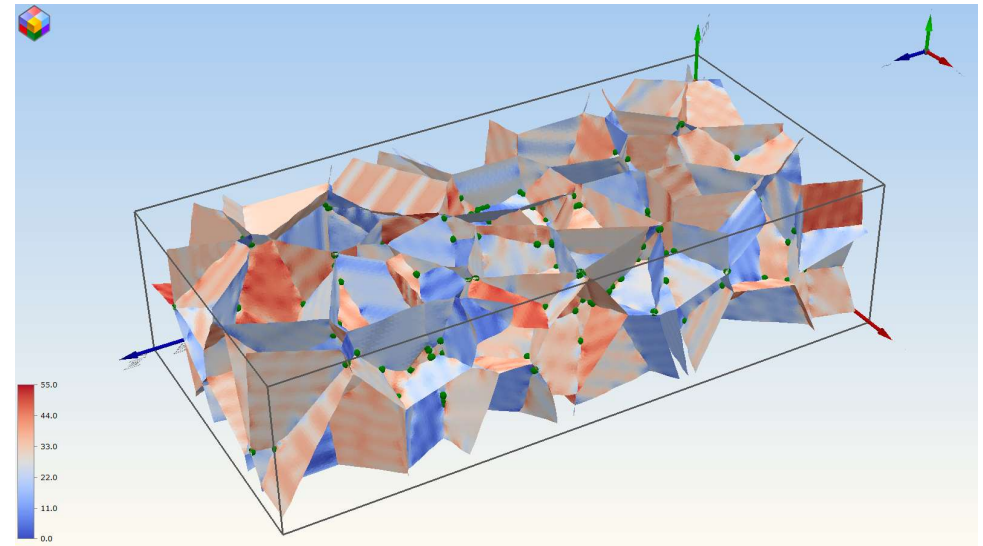
# ESPRIT QUBE

## Surface meshes



### *Mesh structure generation:*

- EBSD grain boundary structure
- Dedicated color codes
- Smoothing
- Filtering



# ESPRIT QUBE

## Surface meshes



---

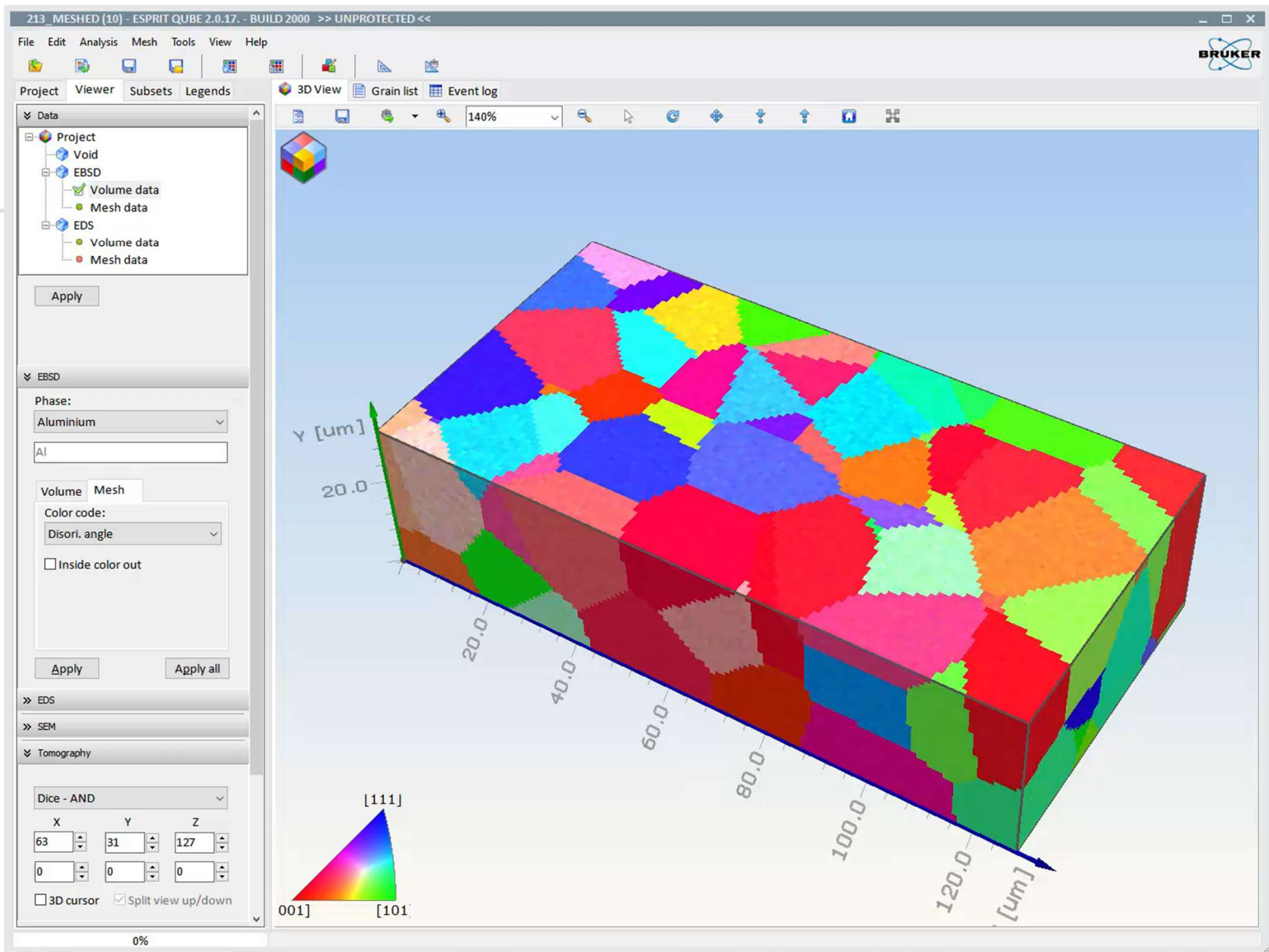
### *Mesh structure generation:*

- EBSD grain boundary structure
- Dedicated color codes
- Smoothing
- Filtering

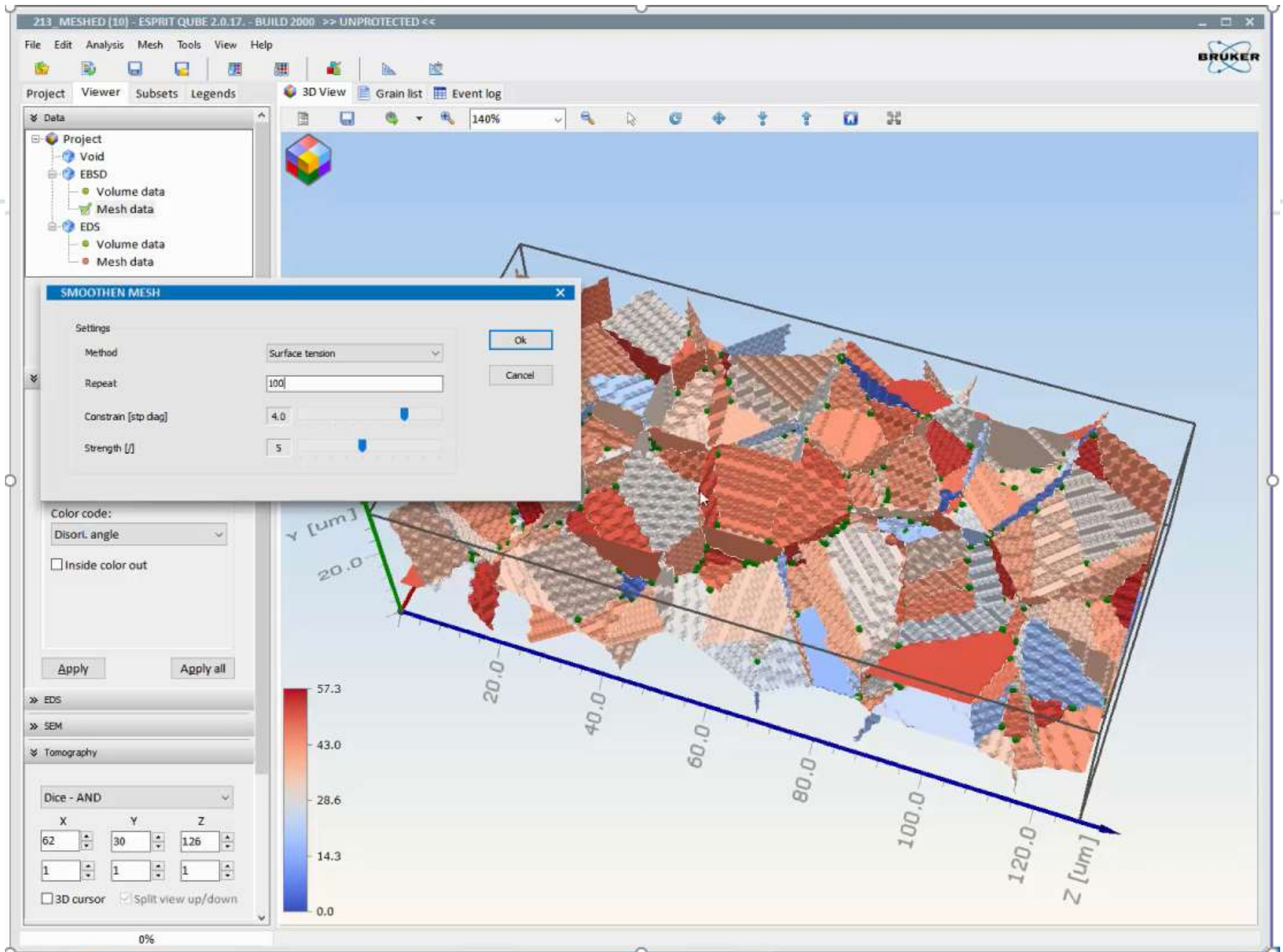
### *Planned*

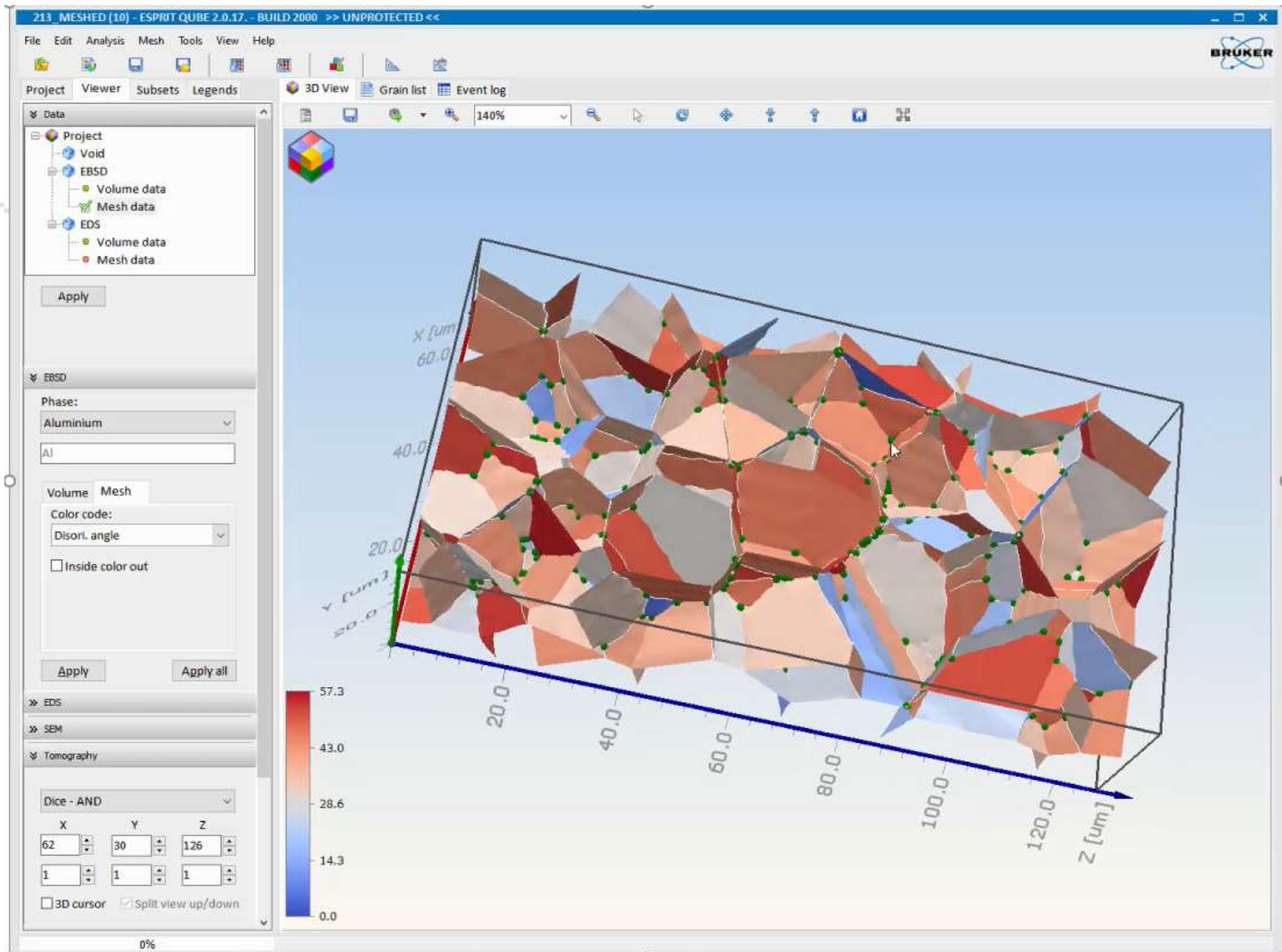
- EDS meshes
- Mesh subsets
- Boundary pole figures

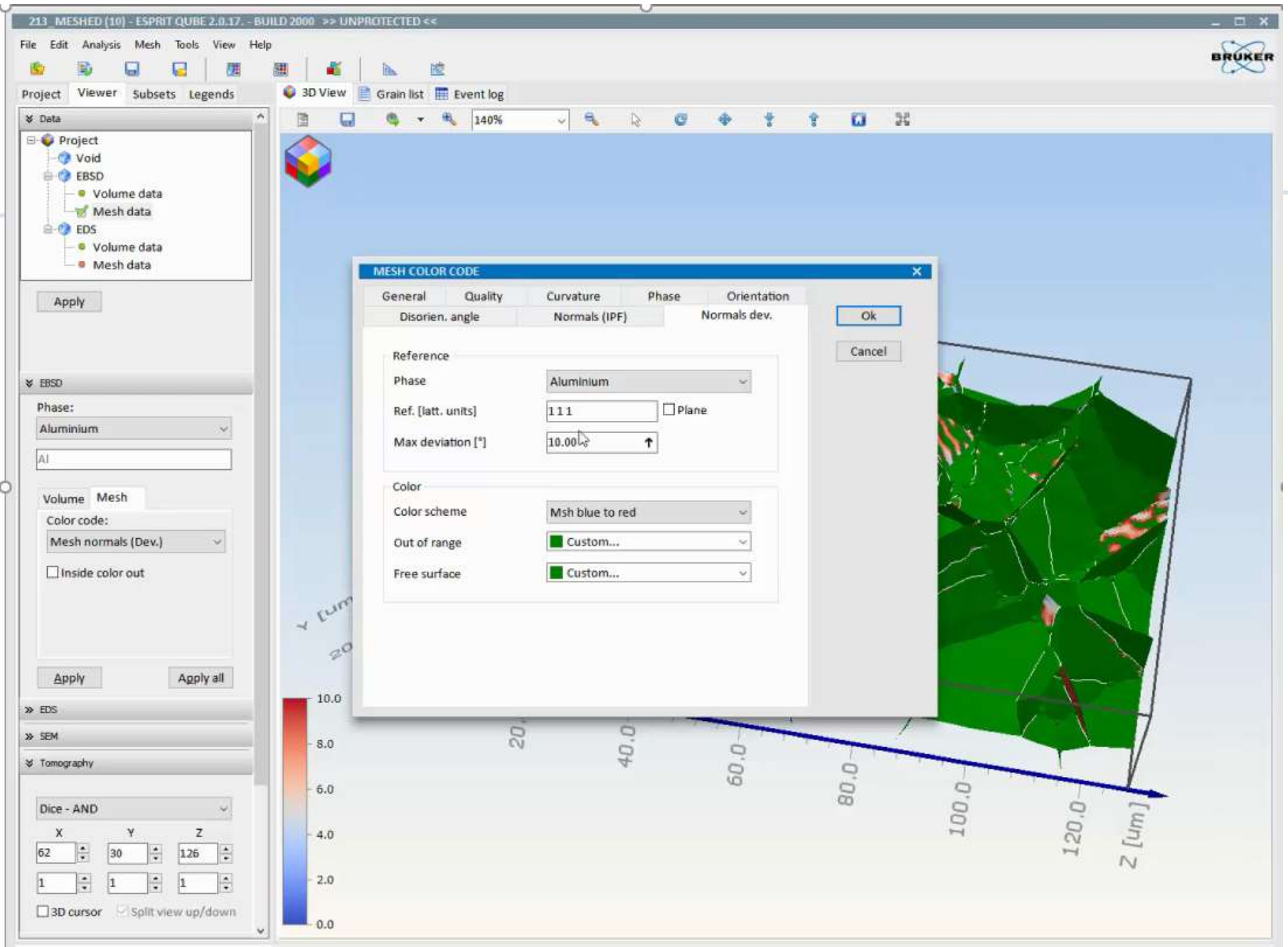












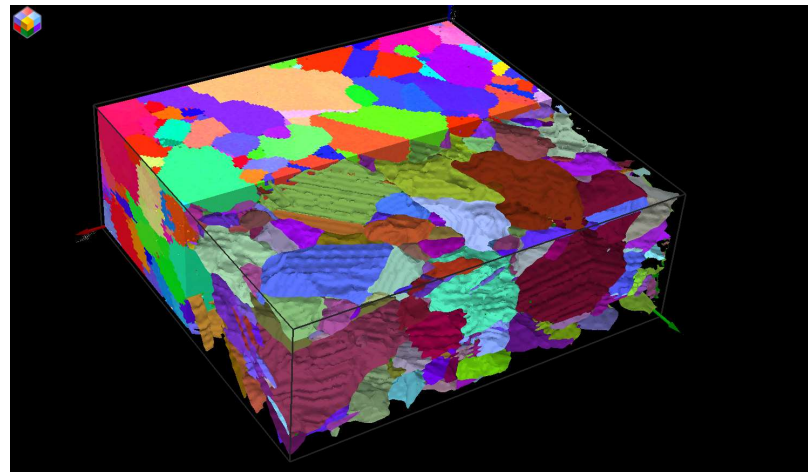
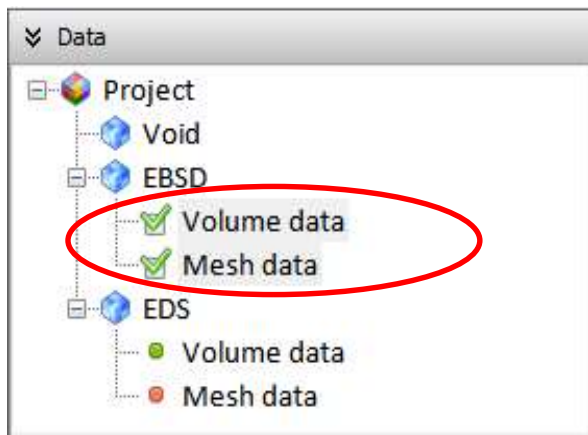
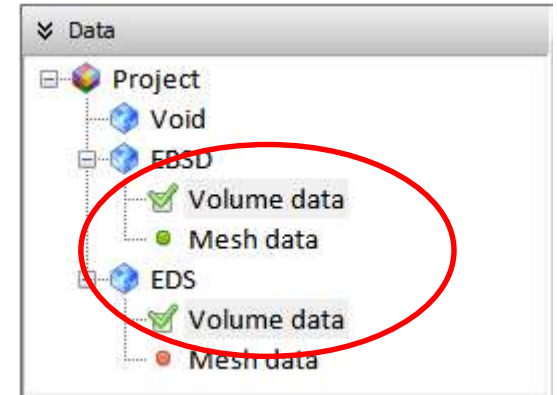
# ESPRIT QUBE

## Data synergy

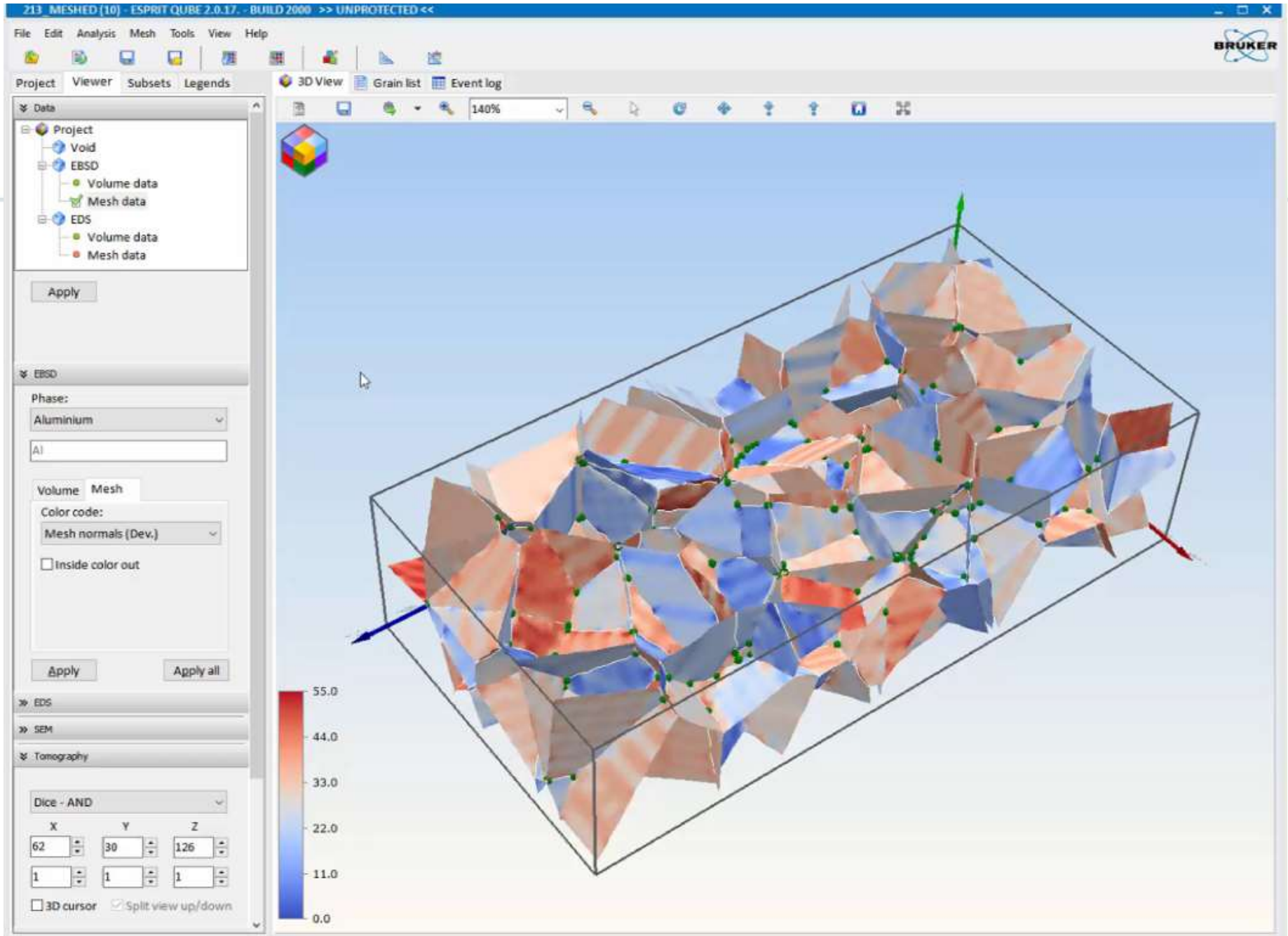


*Simultaneous viewing of data sets / representations:*

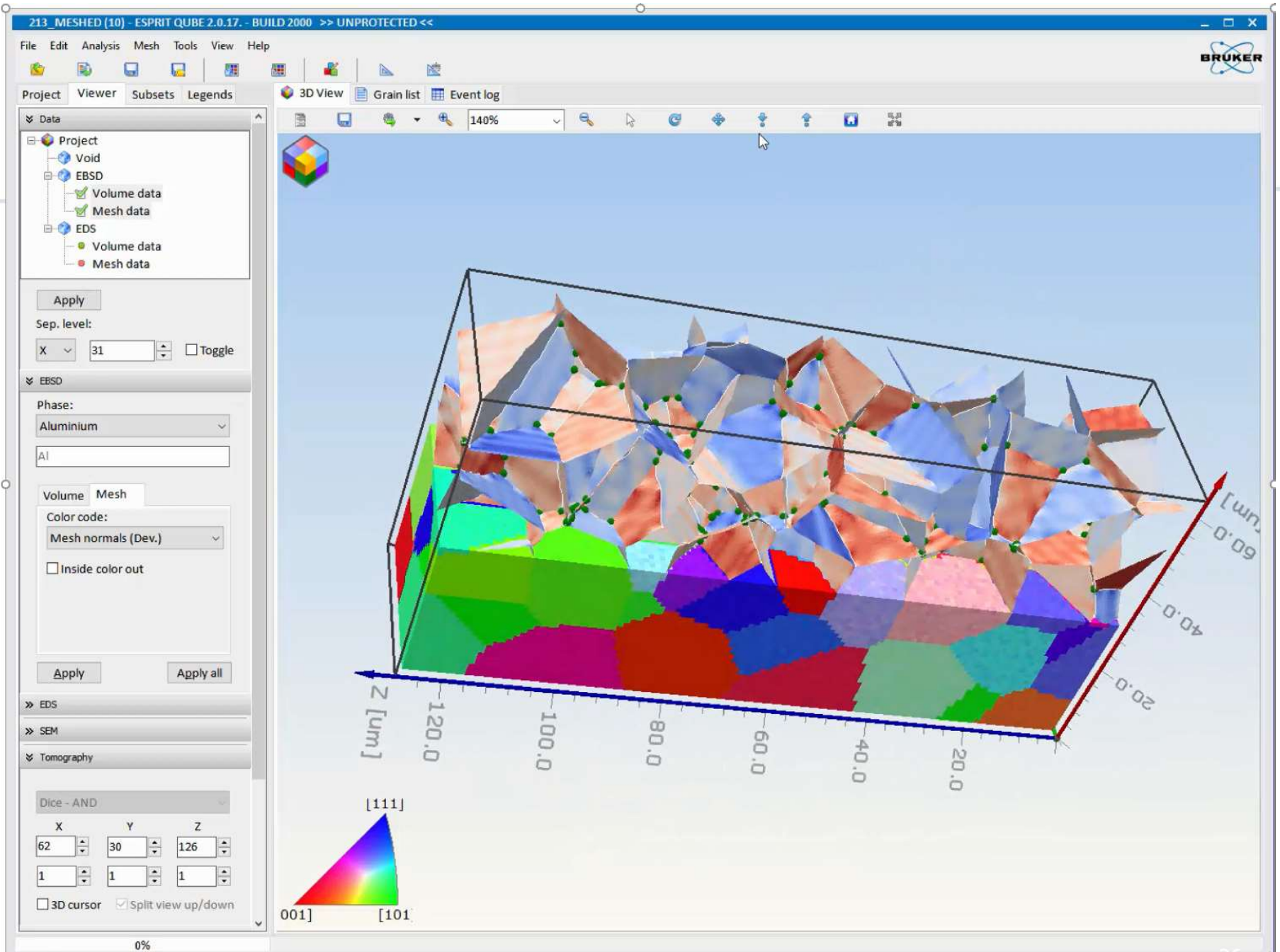
- Color blending: volume - volume
- Separation: volume - mesh

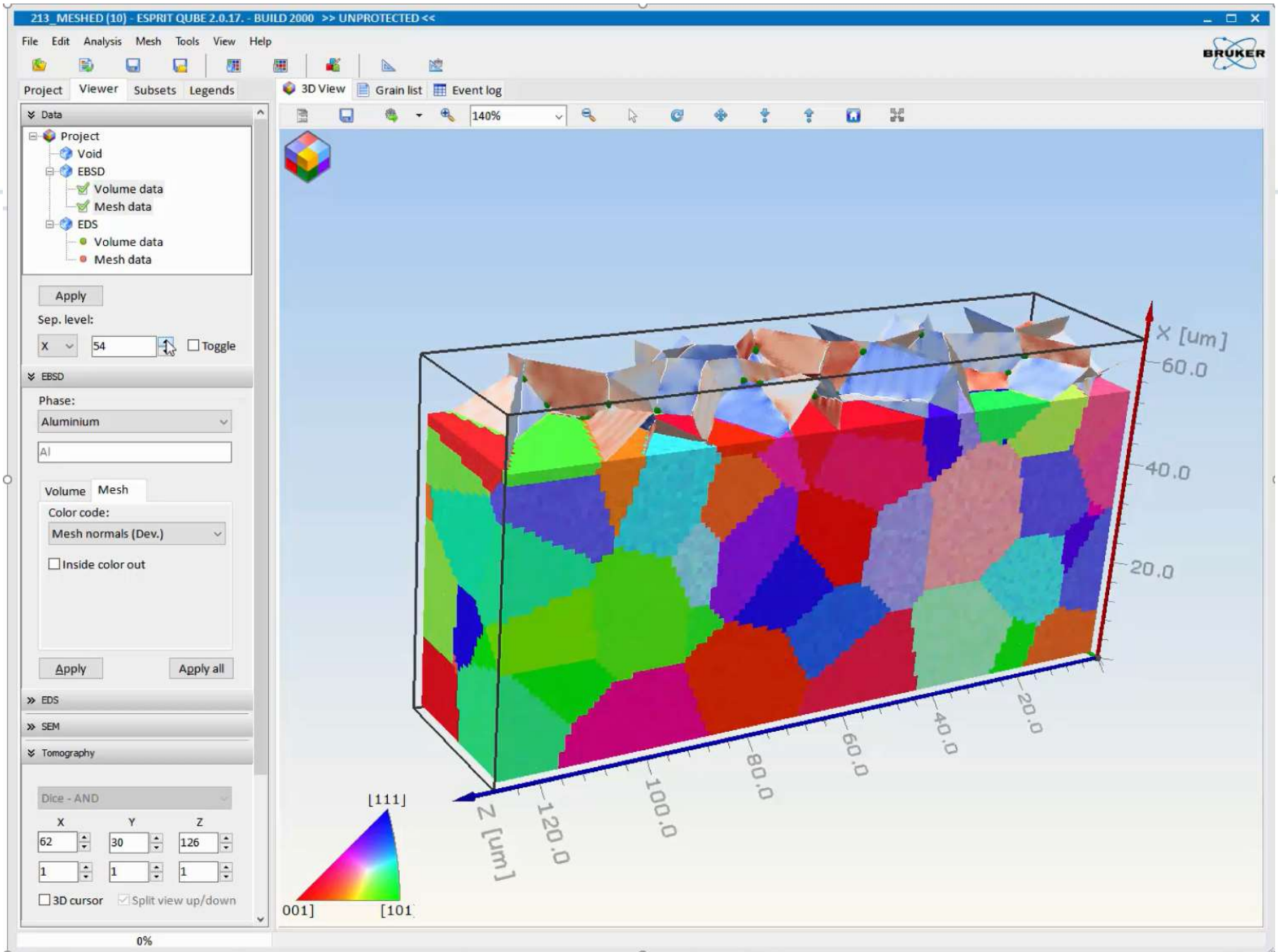


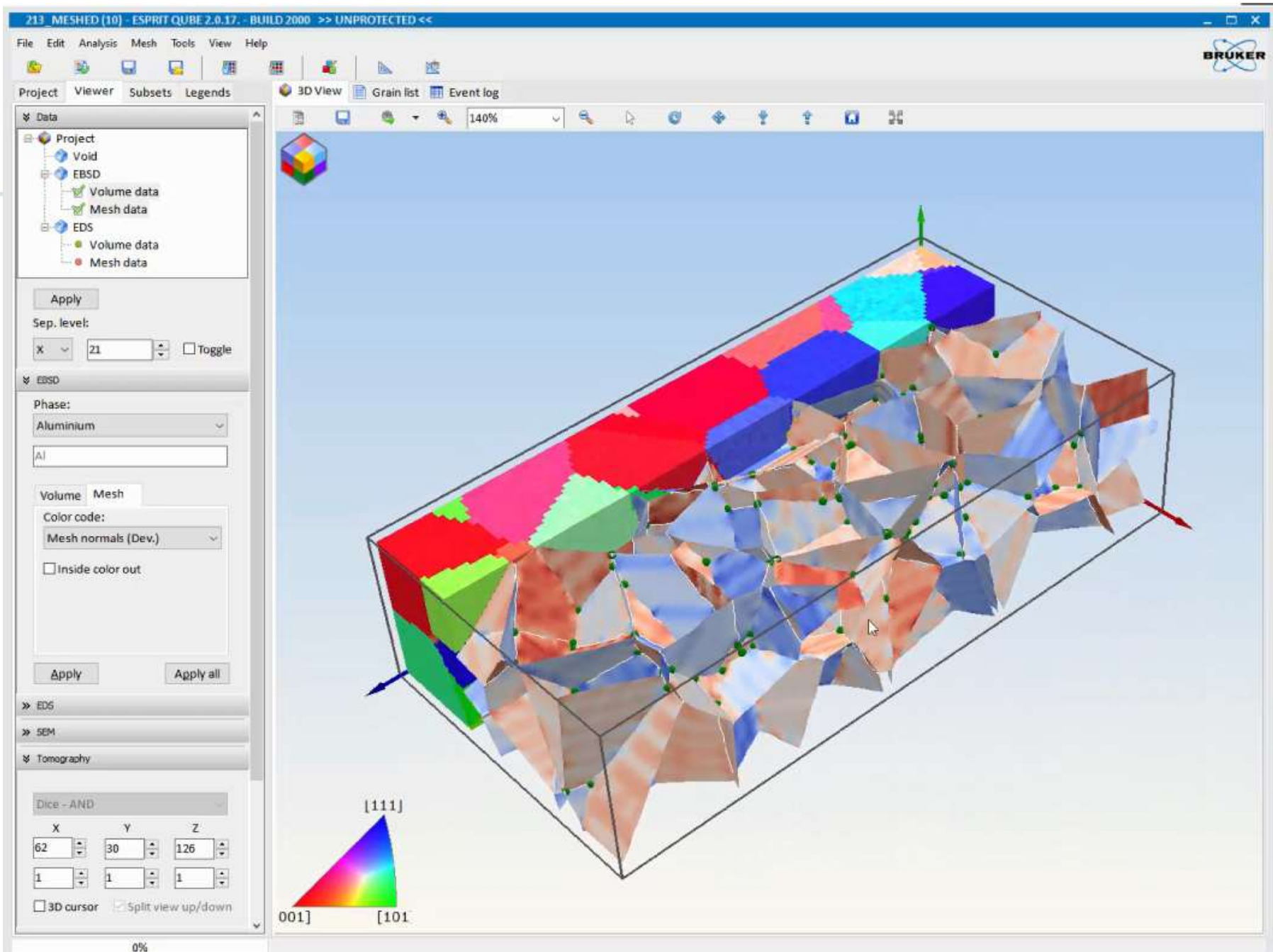




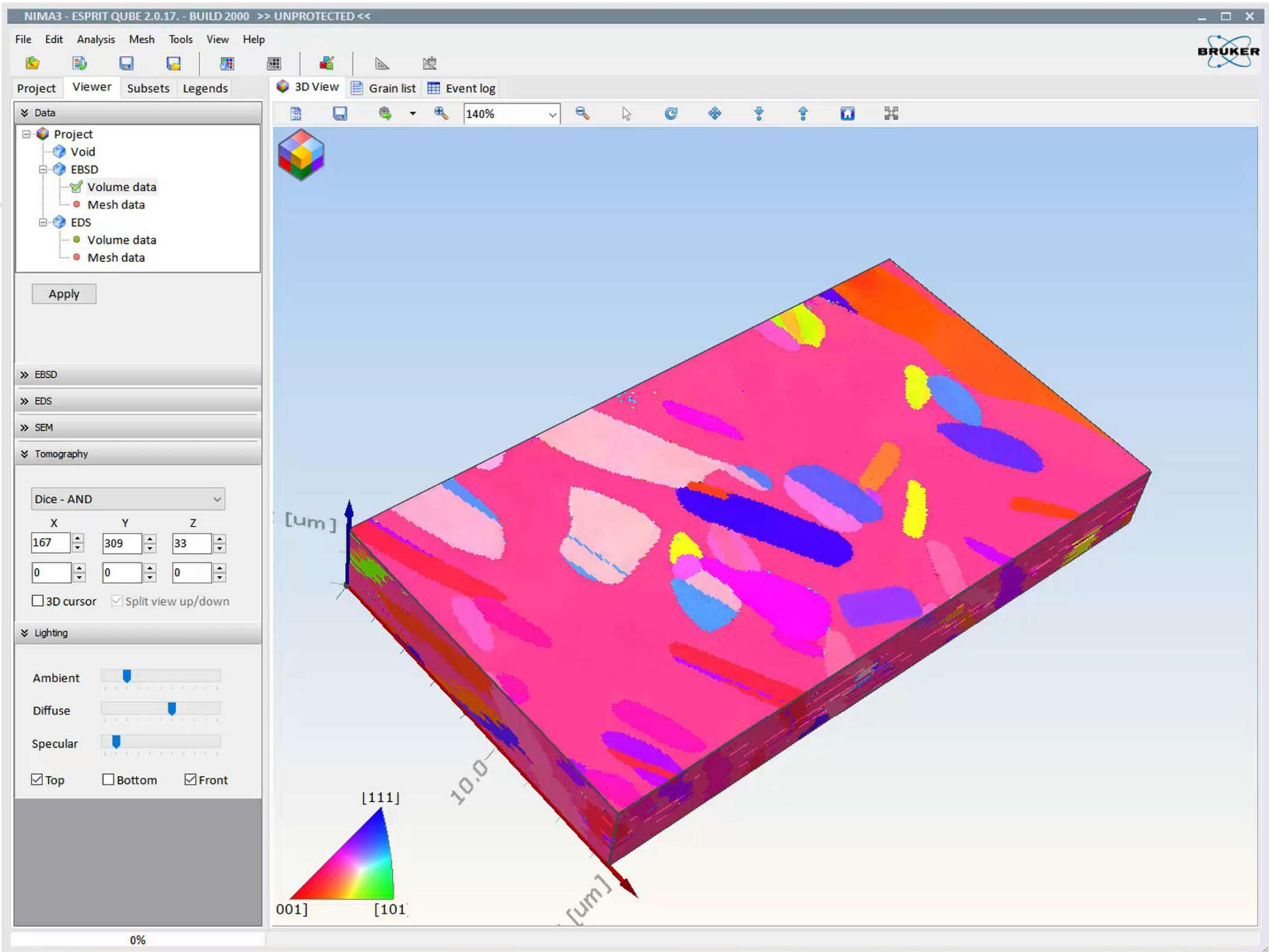


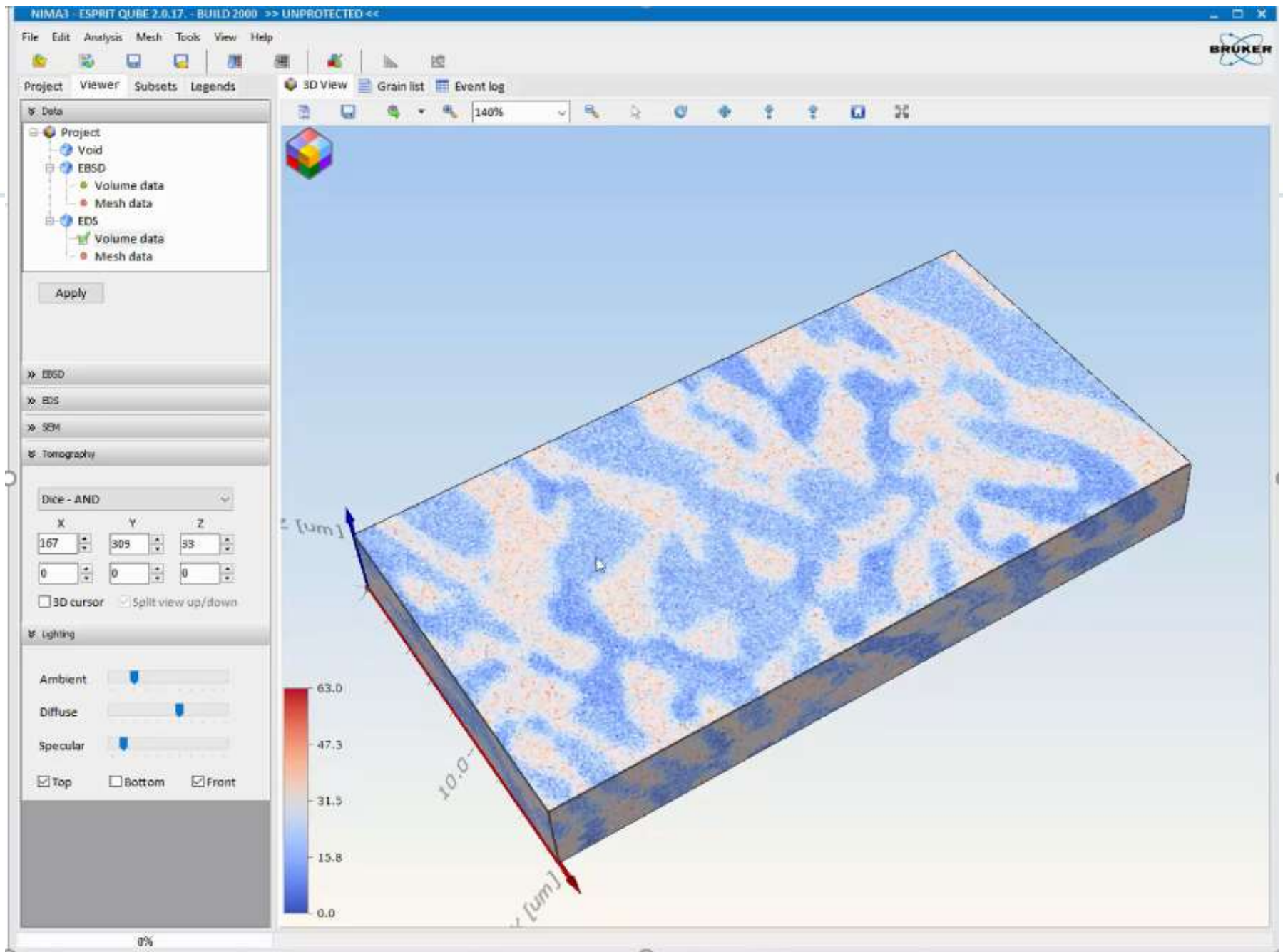




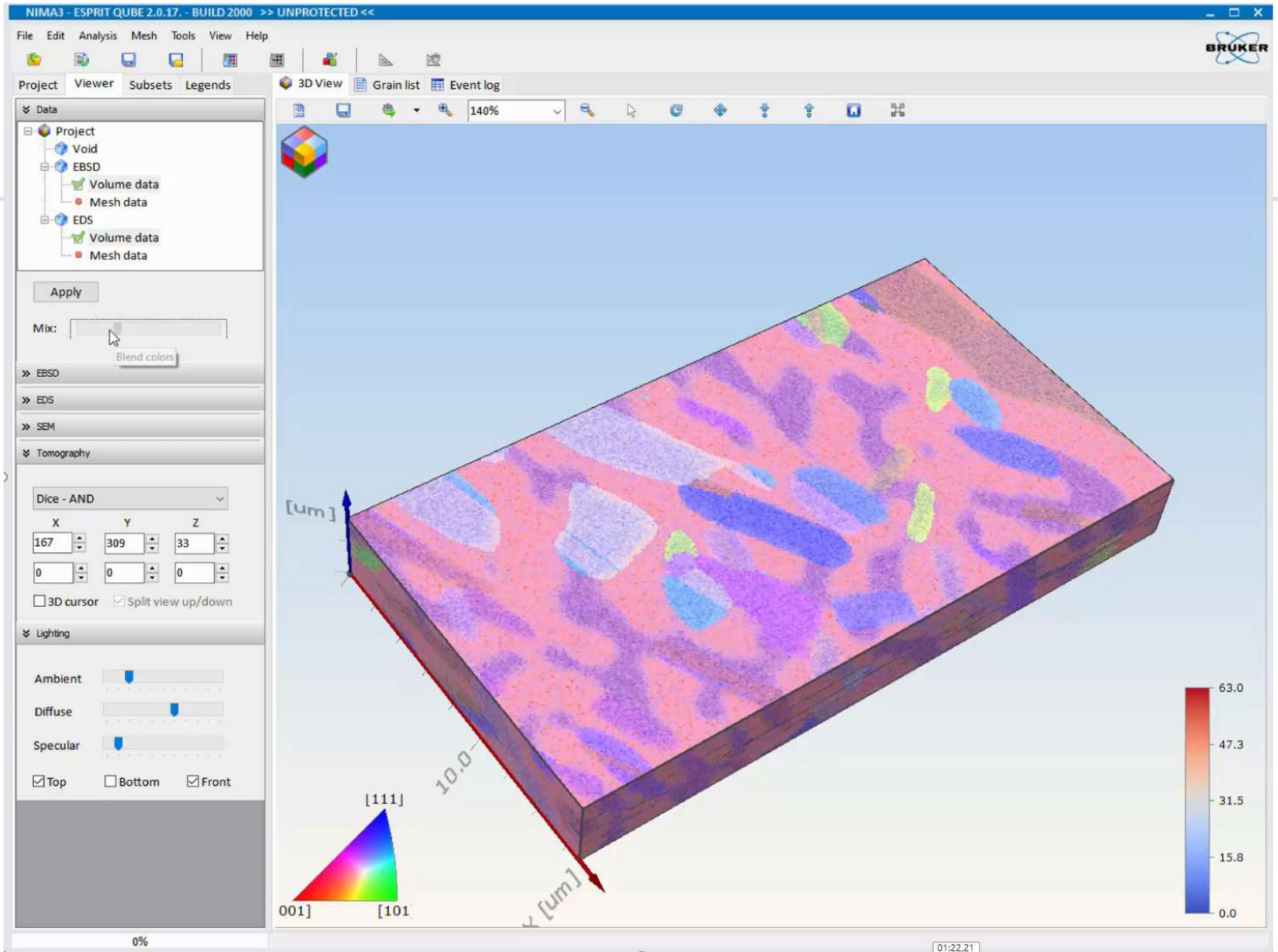












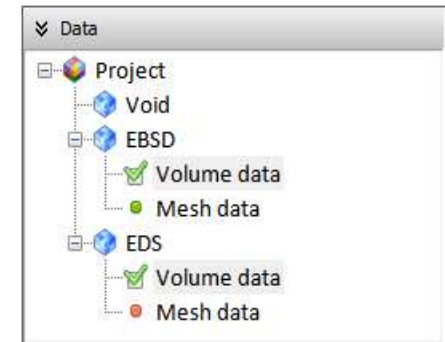
# ESPRIT QUBE

## Data synergy



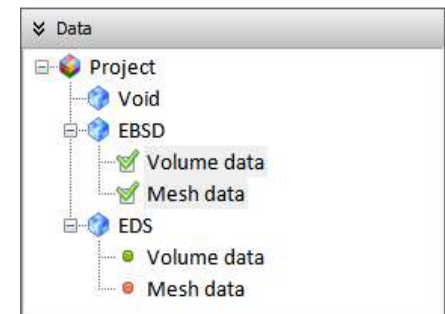
*Simultaneous viewing of data sets / representations:*

- Color blending: volume - volume
- Separation: volume – mesh



*Data set synergy:*

- Operate on multiple data sets simultaneously (limited by the data editing operations)
- Apply subsets across data sets (e.g. apply EBSD subset on EDS data set)



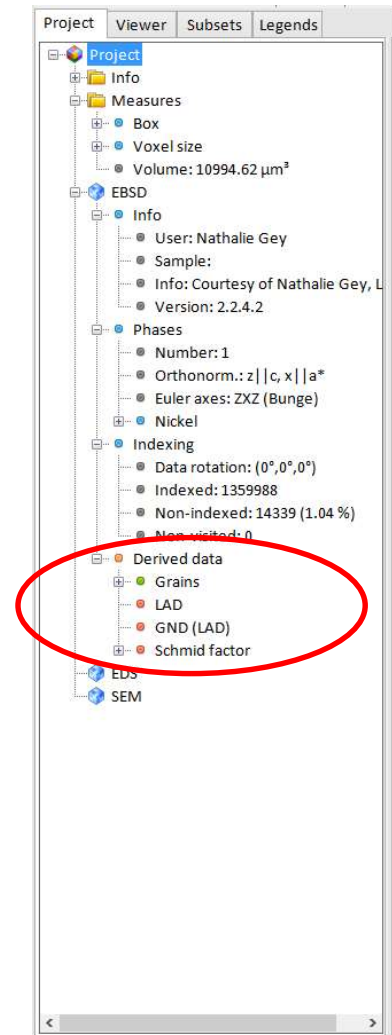
# ESPRIT QUBE

## Data monitoring



### *Data compatibility:*

- Signals whether derived child data is still in sync with parent data.



# ESPRIT QUBE

## Data monitoring



### *Data compatibility:*

- Signals whether derived child data is still in sync with parent data

### *History:*

- Data operations are logged sequentially in project file

### *Reversibility:*

- Data changing operations can be undone

```
3D View | Grain list | Event log
z = 12: Ni_ken_2nd_Slice0050.ctf
z = 11: Ni_ken_2nd_Slice0051.ctf
z = 10: Ni_ken_2nd_Slice0052.ctf
z = 9: Ni_ken_2nd_Slice0053.ctf
z = 8: Ni_ken_2nd_Slice0054.ctf
z = 7: Ni_ken_2nd_Slice0055.ctf
z = 6: Ni_ken_2nd_Slice0056.ctf
z = 5: Ni_ken_2nd_Slice0057.ctf
z = 4: Ni_ken_2nd_Slice0058.ctf
z = 3: Ni_ken_2nd_Slice0059.ctf
z = 2: Ni_ken_2nd_Slice0060.ctf
z = 1: Ni_ken_2nd_Slice0061.ctf
z = 0: Ni_ken_2nd_Slice0062.ctf
Finished : 06/06/2016 20:07:23

Cropping XY dimensions
Started : 06/06/2016 20:09:17
New X-size : 418 (@ old X=205)
New Y-size : 383 (@ old Y=58)
New/old : 0.51
Finished : 06/06/2016 20:09:25

Cropping XY dimensions
Started : 14/06/2016 16:34:29
New X-size : 171 (@ old X=130)
New Y-size : 141 (@ old Y=110)
New/old : 0.15
Finished : 14/06/2016 16:34:31

Median orientation filtering for all phases
Started : 14/06/2016 16:35:31
Kernel size : 3
Threshld angle : 3 deg
Conv. angle : 0.1 deg
Failed voxels : 0
Finished : 14/06/2016 16:36:35

Reconstructing grains
Started : 14/06/2016 18:02:22
Aborted : 14/06/2016 18:02:55
Recovery : failed

Reconstructing grains
Started : 14/06/2016 18:03:05
Threshld angle : 5
Neighbors : 1st 2nd 3rd
Clean up : add to similar NB - keep orientations
Threshld vol : 3
Grns removed : 520
States chngd : 0
Grns total : 964
Finished : 14/06/2016 18:03:24
```



# Summary



- 
- Tool for post-acquisition analysis of tomographic data sets
  - Dedicated for EBSD and EDS data sets
  - Wysiwyg
  - Extensive subset possibilities
  - Convenient data monitoring
  - Growing functionality

## Are There Any Questions?

Please type in the questions you might have  
in the Q&A box and press *Send*

## More Information



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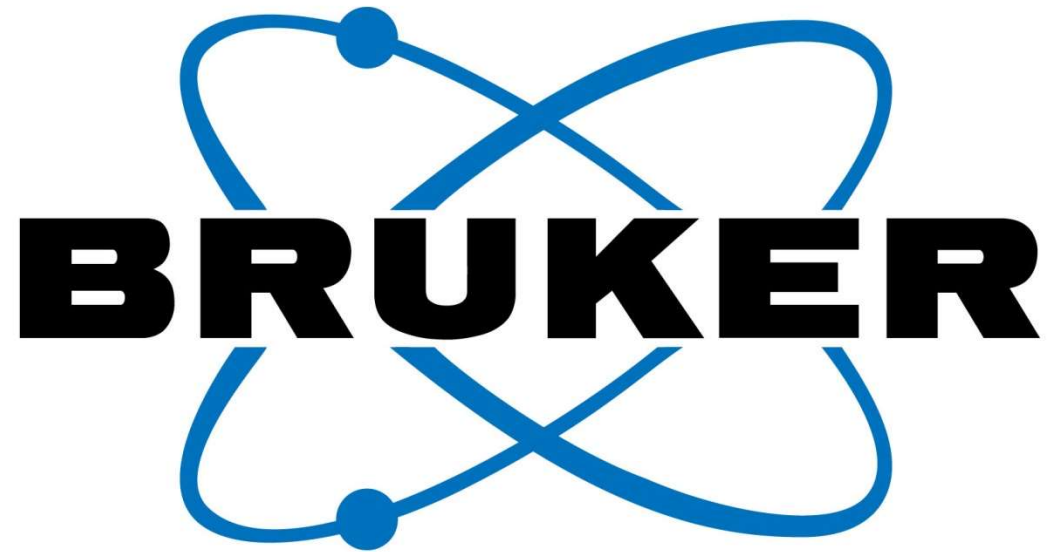
**For more information, please contact us:**

[laurie.palasse@bruker.com](mailto:laurie.palasse@bruker.com)

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[info.bna@bruker.com](mailto:info.bna@bruker.com)

<https://www.bruker.com/products/x-ray-diffraction-and-elemental-analysis/eds-wds-ebsd-sem-micro-xrf-and-sem-micro-ct/quantax-ebsd/overview.html>



[www.bruker.com](http://www.bruker.com)