MATERIALS WEEK EUROPE

The next speaker is...

Dr. Koen Vervaeke
CEO / Founder
Magcam

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Assuring Recycled Permanent Magnet Quality in R&D and Production

Scan below for Conference Agenda

Assuring recycled permanent magnet quality in R&D and production using Magcam Magnetic field cameras

Dr. Koen Vervaeke, Founder / CEO

koen.vervaeke@magcam.com

Materials Week Europe 2026, 25 February 2026, Amsterdam, The Netherlands

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The Magnetics™ Show EUROPE

MATERIALS WEEK EUROPE

Contents

- Magcam company
- Magnetic field camera measurement technology
  - Single magnet measurements
  - PM rotor measurements
- MagScope data analysis suite
- Case study: High temperature recycled magnet testing
  - Grain boundary diffusion (GBD)
  - In-situ magnetic field mapping up to 120°C
  - Study of reversible vs irreversible thermal demagnetization

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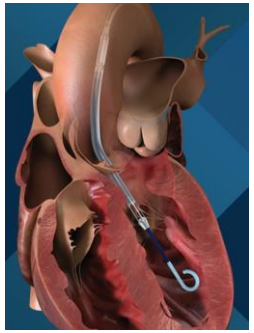
Magcam Mission

To contribute to our customers' success by helping them understand their magnets and optimize their products in ways not possible before



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Worldwide Magcam Customer Base

Automotive OEMS and suppliers

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Worldwide Magcam Customer Base

Portable consumer	Medical	Renewable energy	Other

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3D Magnetic field camera technology

Fast high resolution magnetic field mapping

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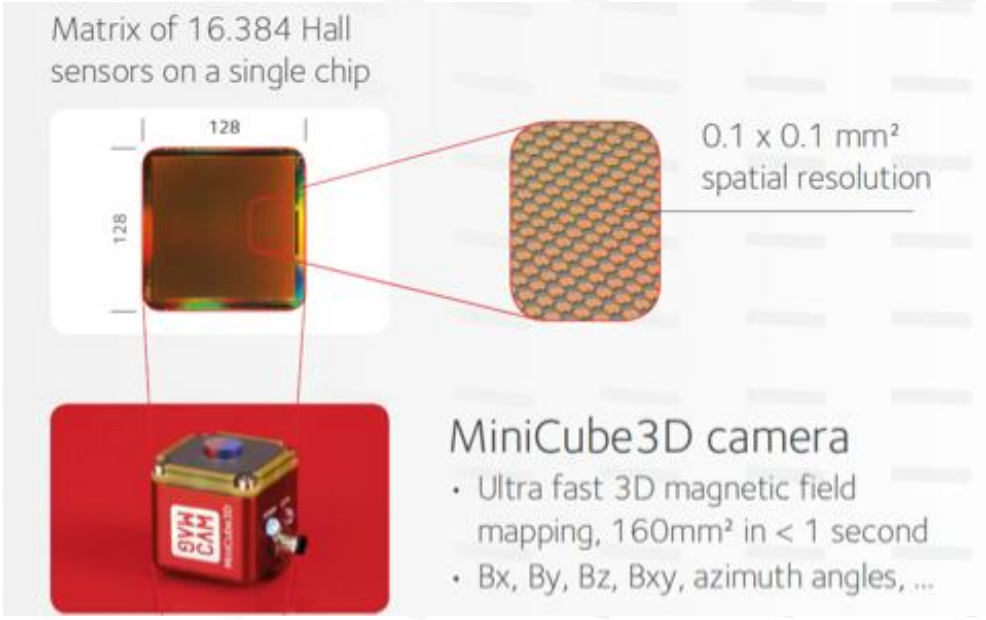
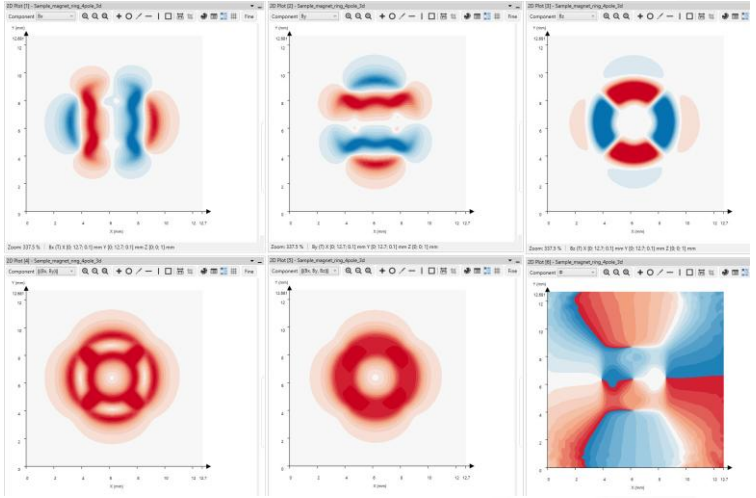
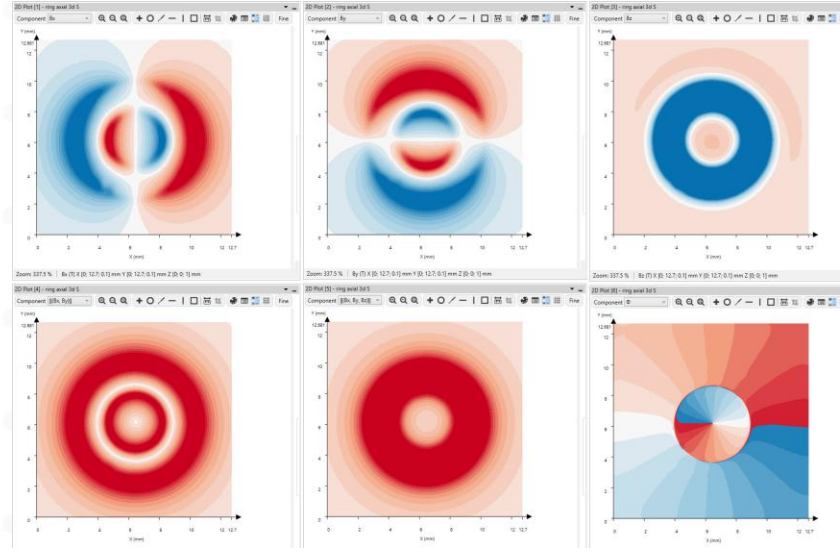
‘SMART’ 3D MAGNETIC FIELD CAMERA

Magcam MiniCube3D

- Proven patented 3D magnetic field camera technology
  - 15 years in the market
- Superior Bx, By, Bz data quality
  - All components measured at same position
  - Equal sensitivity of all components
  - Perfect orthogonality
  - No crosstalk
- 128 x 128 (=16384) pixels
- 100µm spatial resolution
- Powerful combination with MagScope analysis software







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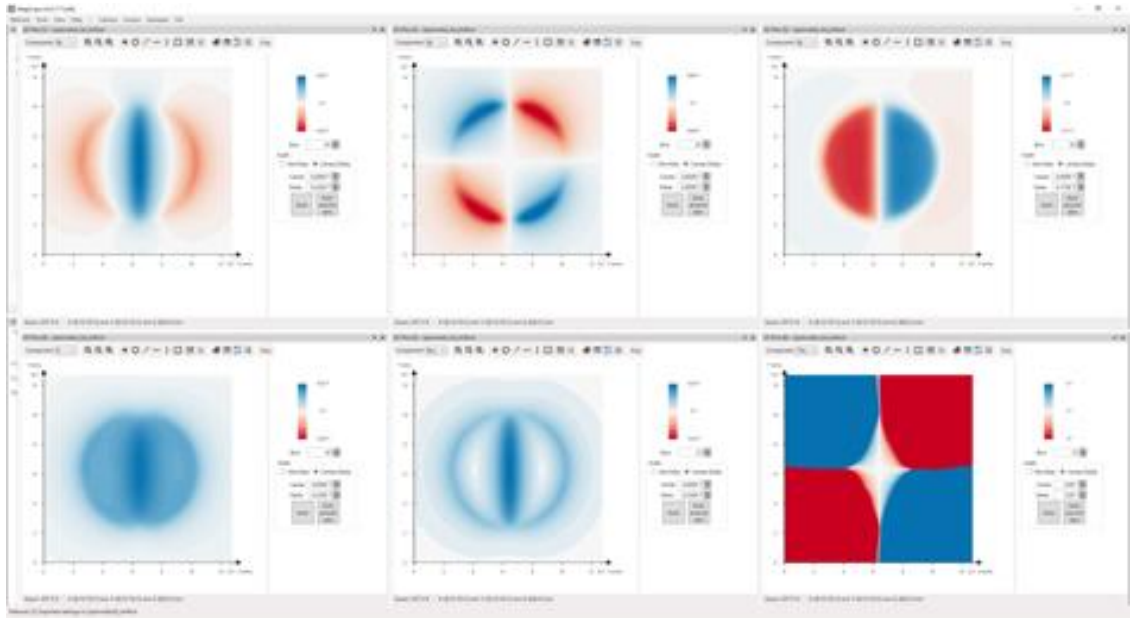
Measuring small magnets (< 10mm)

Magcam MiniTable

- Magnet placed directly onto MiniCube3D surface
- Calibrated positioning frame
- 0.3 mm sensor-sample distance
- < 1 second for full magnetic field map



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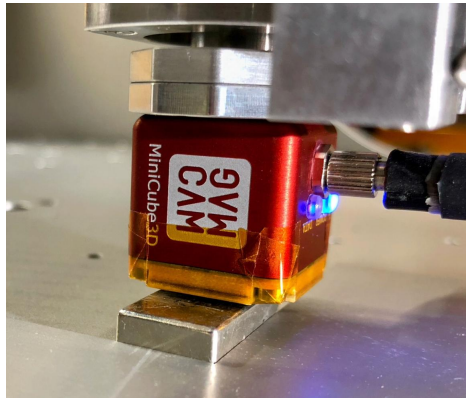
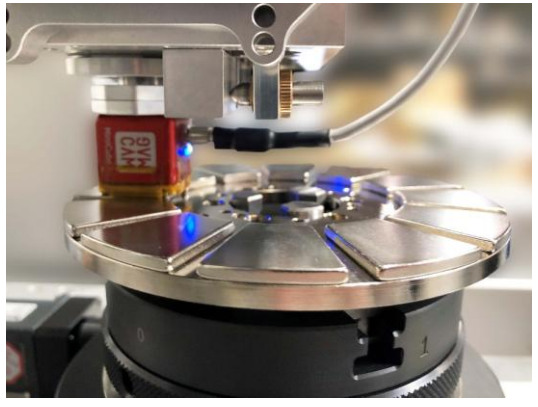
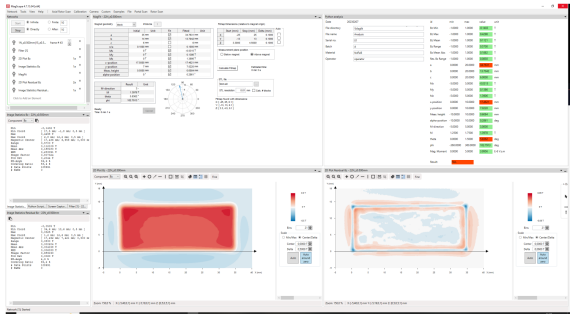
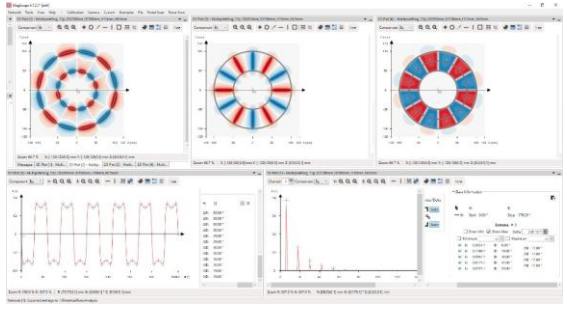
Measuring single magnets and assemblies axial- and radial-flux rotors

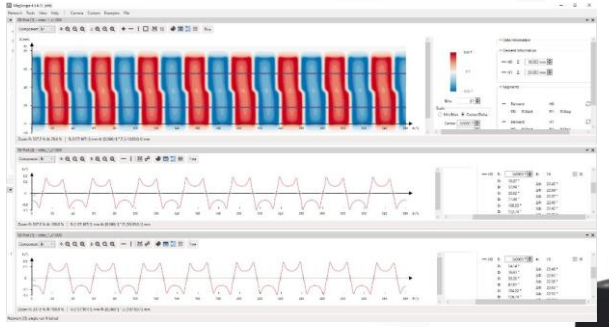
Magcam Combi Scanner

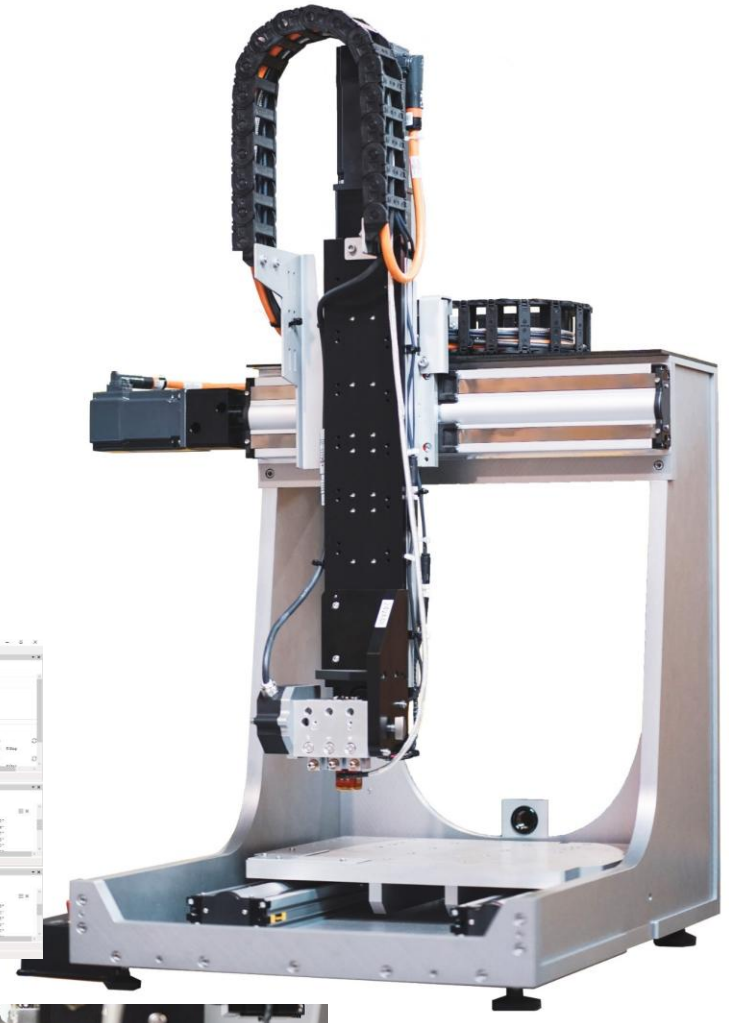


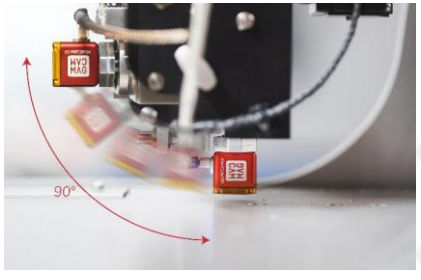












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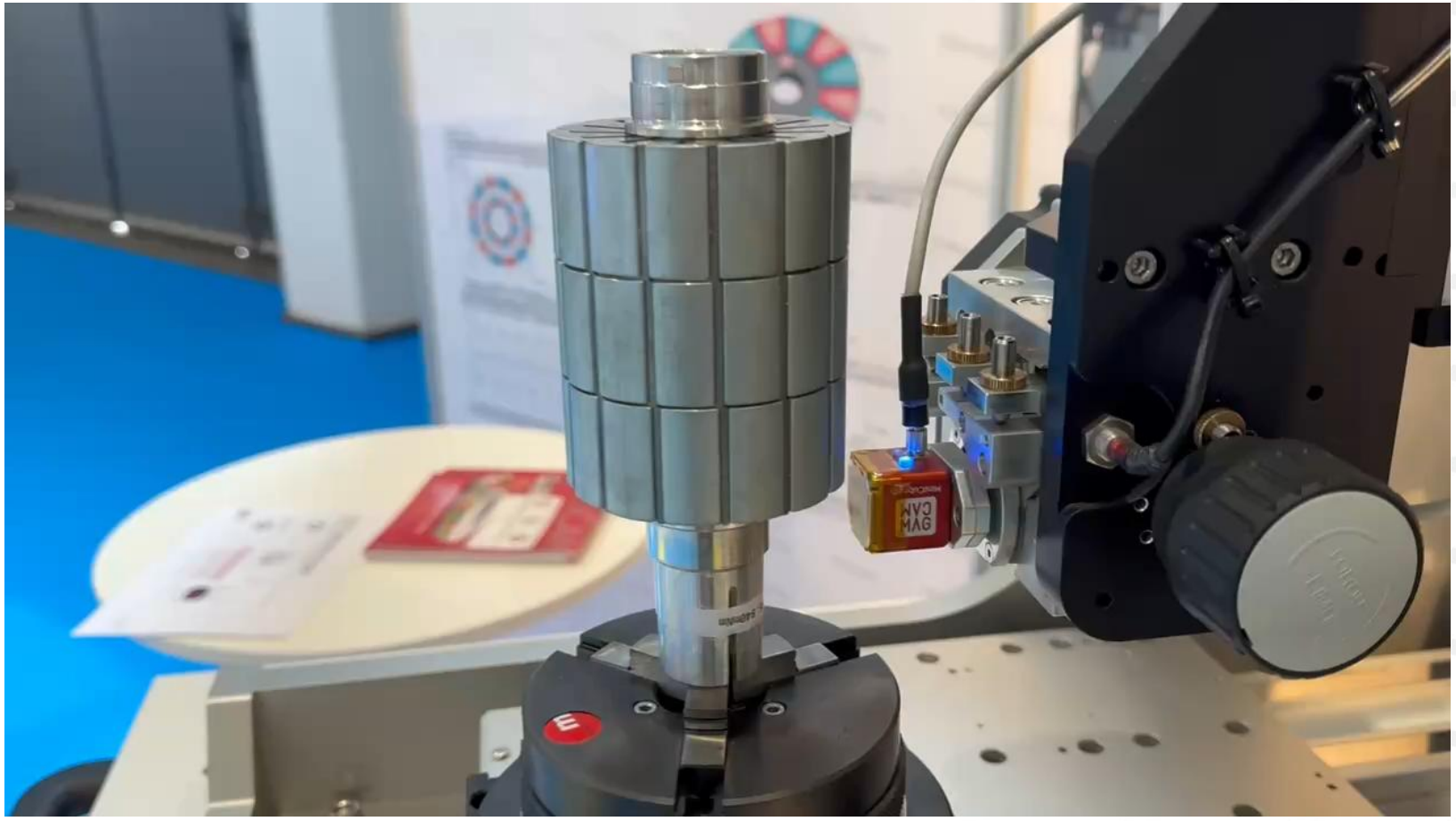
Radial-flux PM rotor measurements



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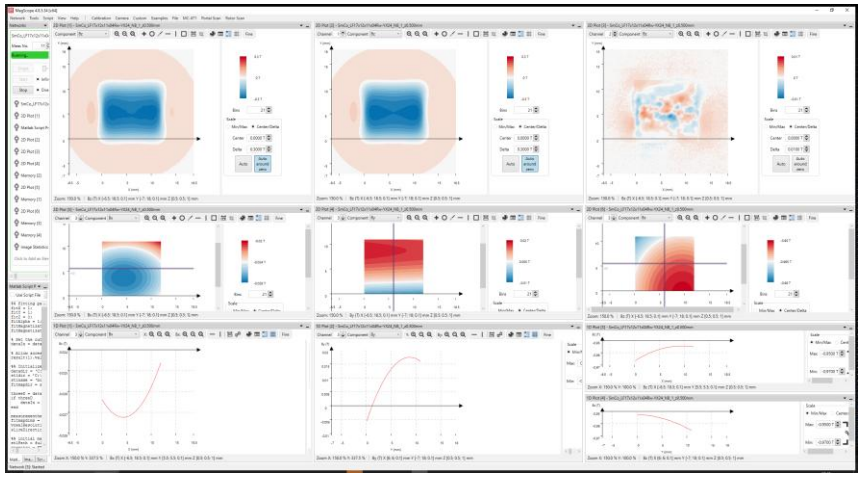
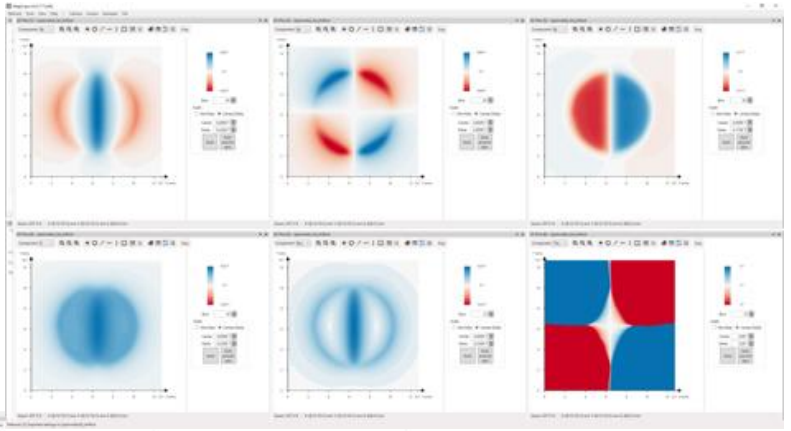
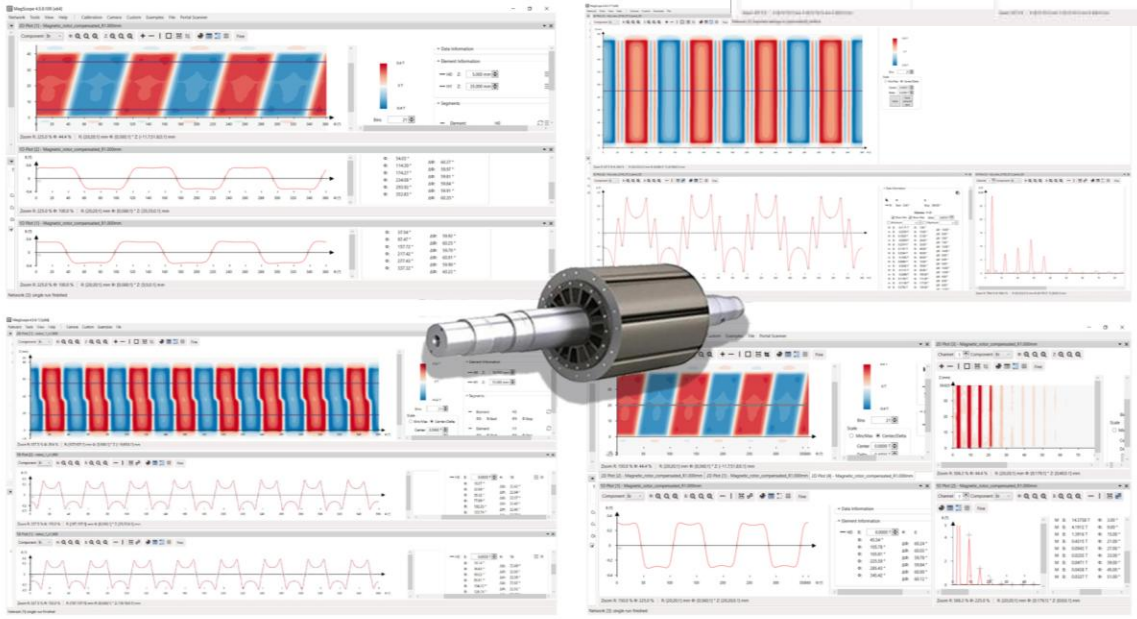
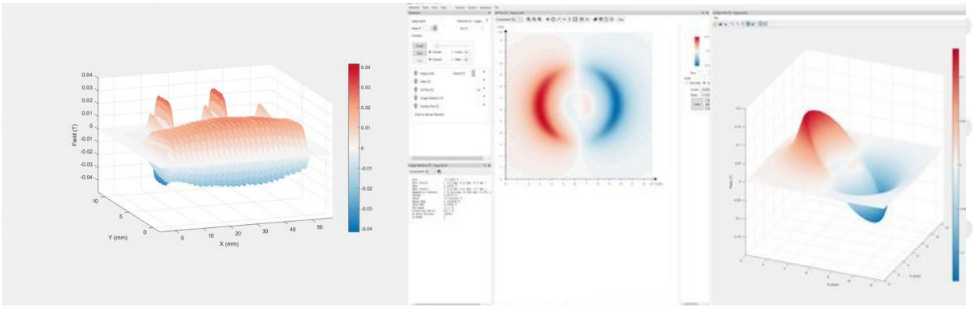
MagScope data analysis software









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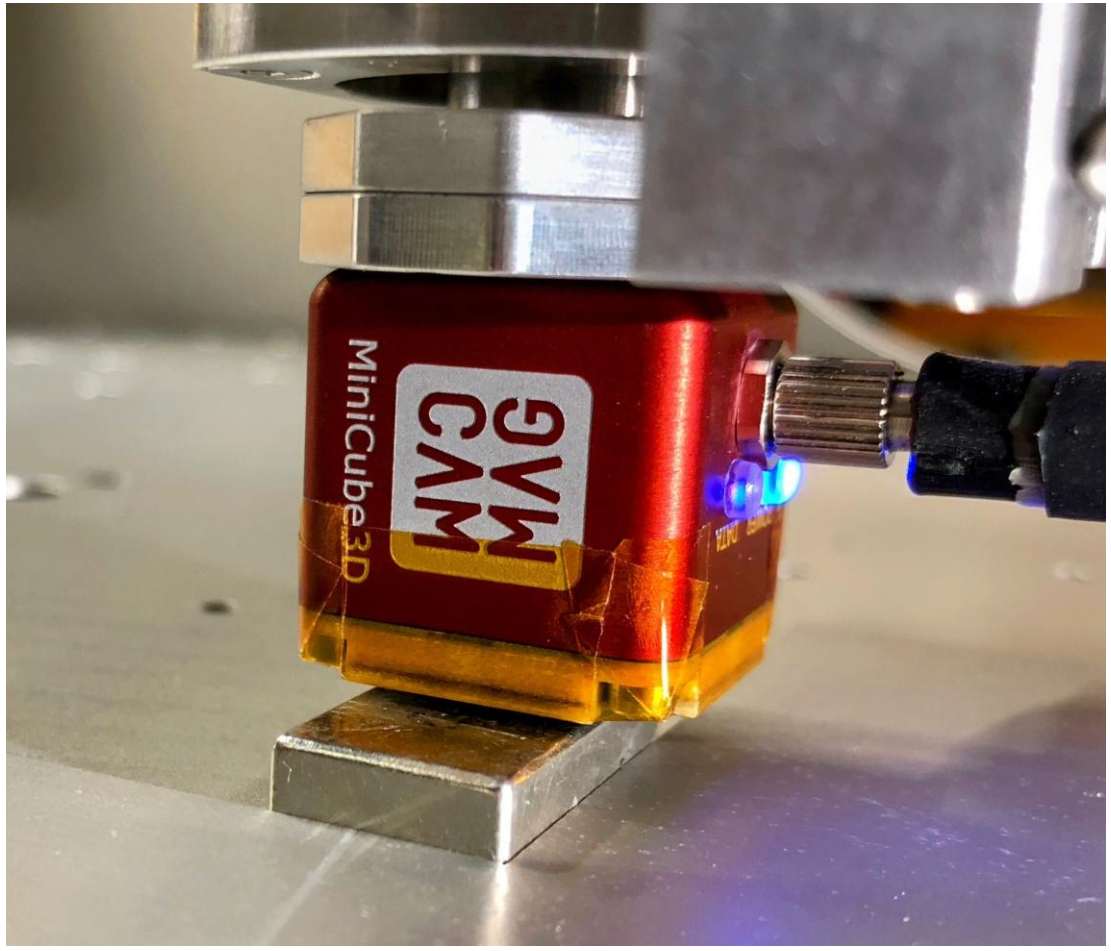
Individual magnet measurements



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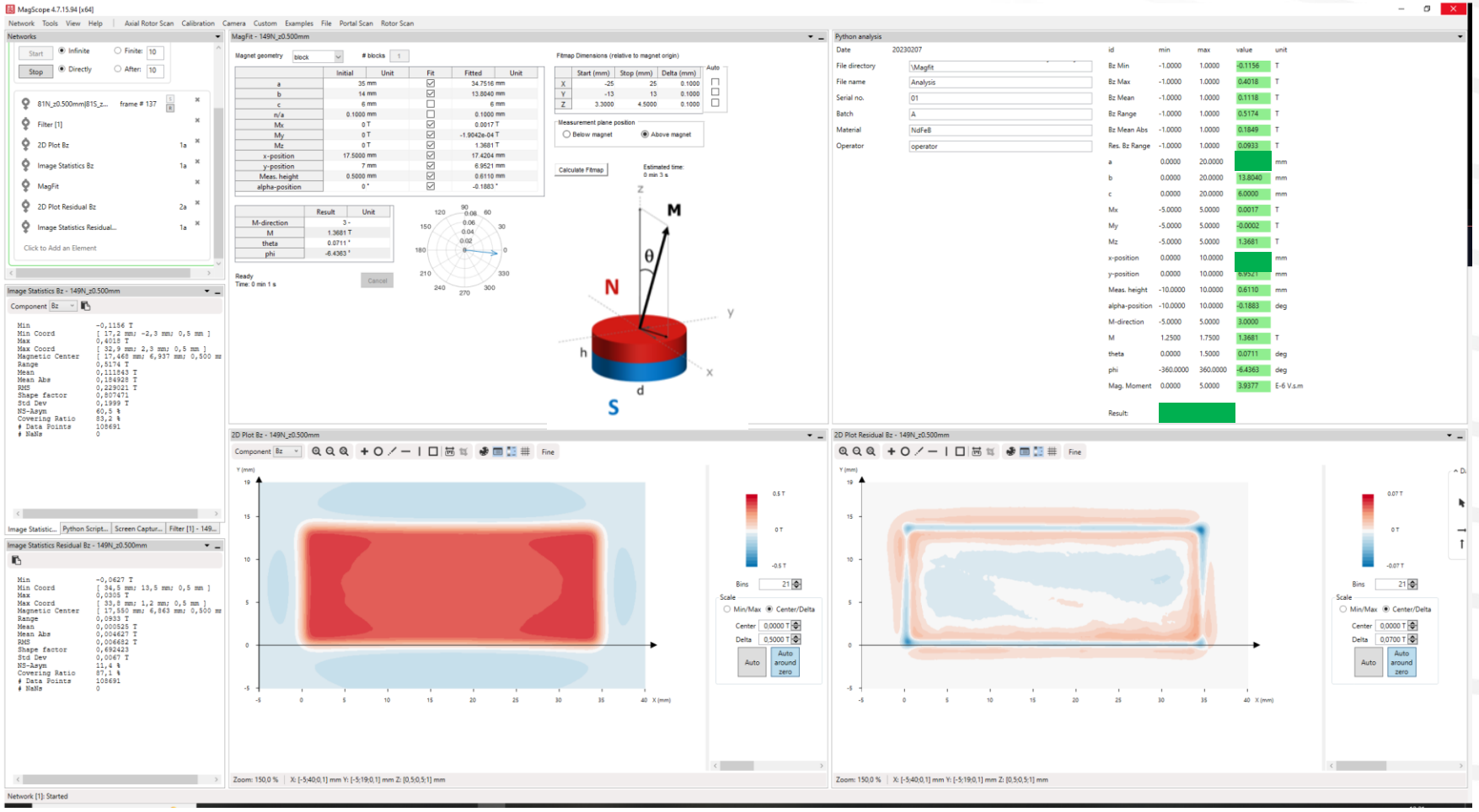
Individual magnet MagFit analysis

N-pole, small angle error



Individual magnet MagFit analysis

N-pole, large angle error

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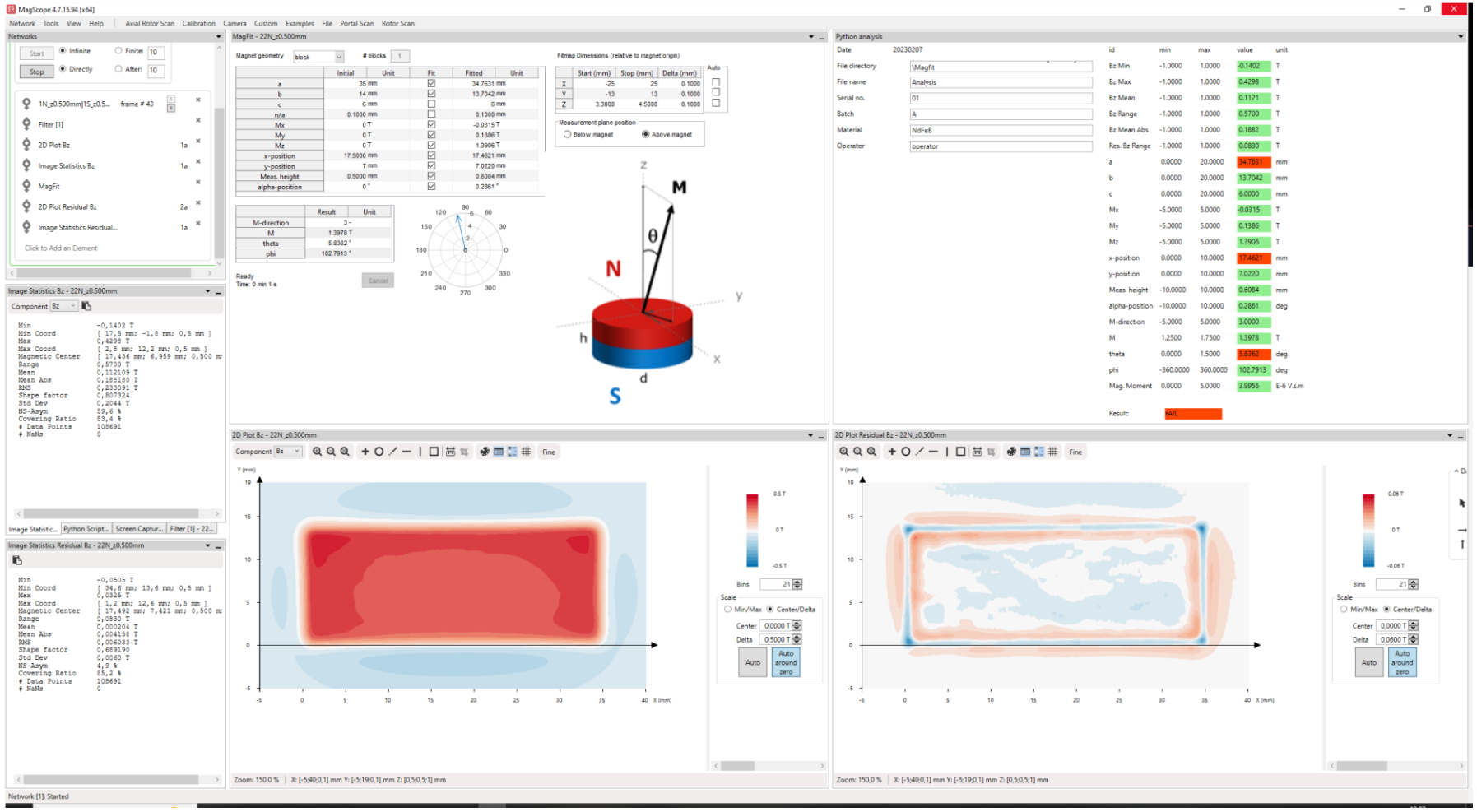
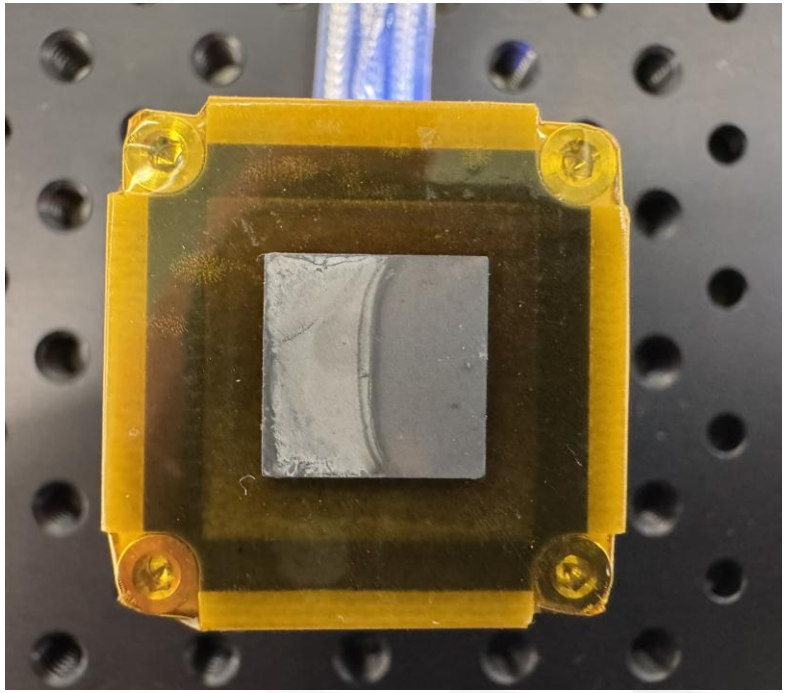


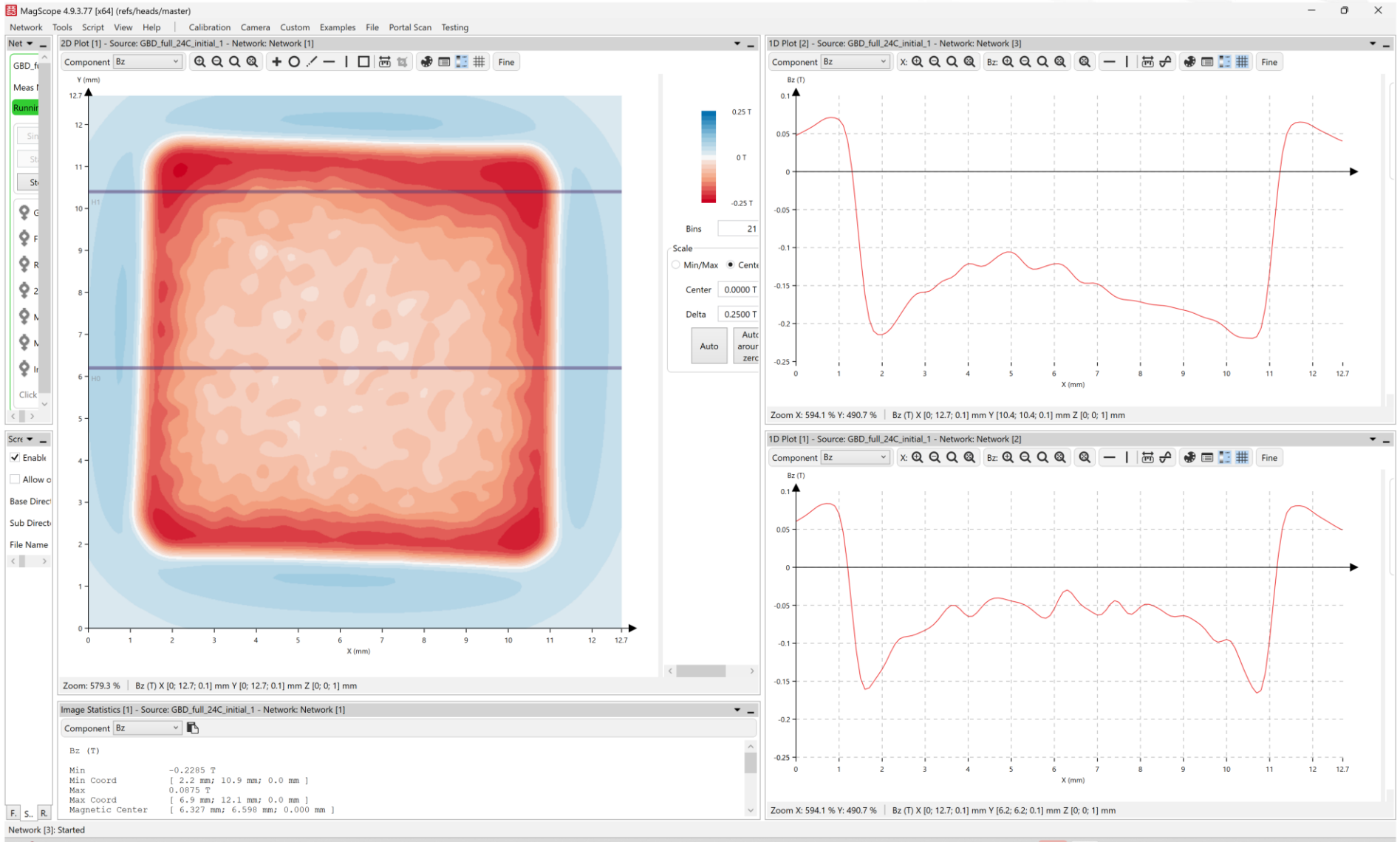
Recycled magnet testing

Magnet samples
(provided by Hochschule Pforzheim)

- Recycled NdFeB
- GBD



‘full’ sample, virgin 24°C



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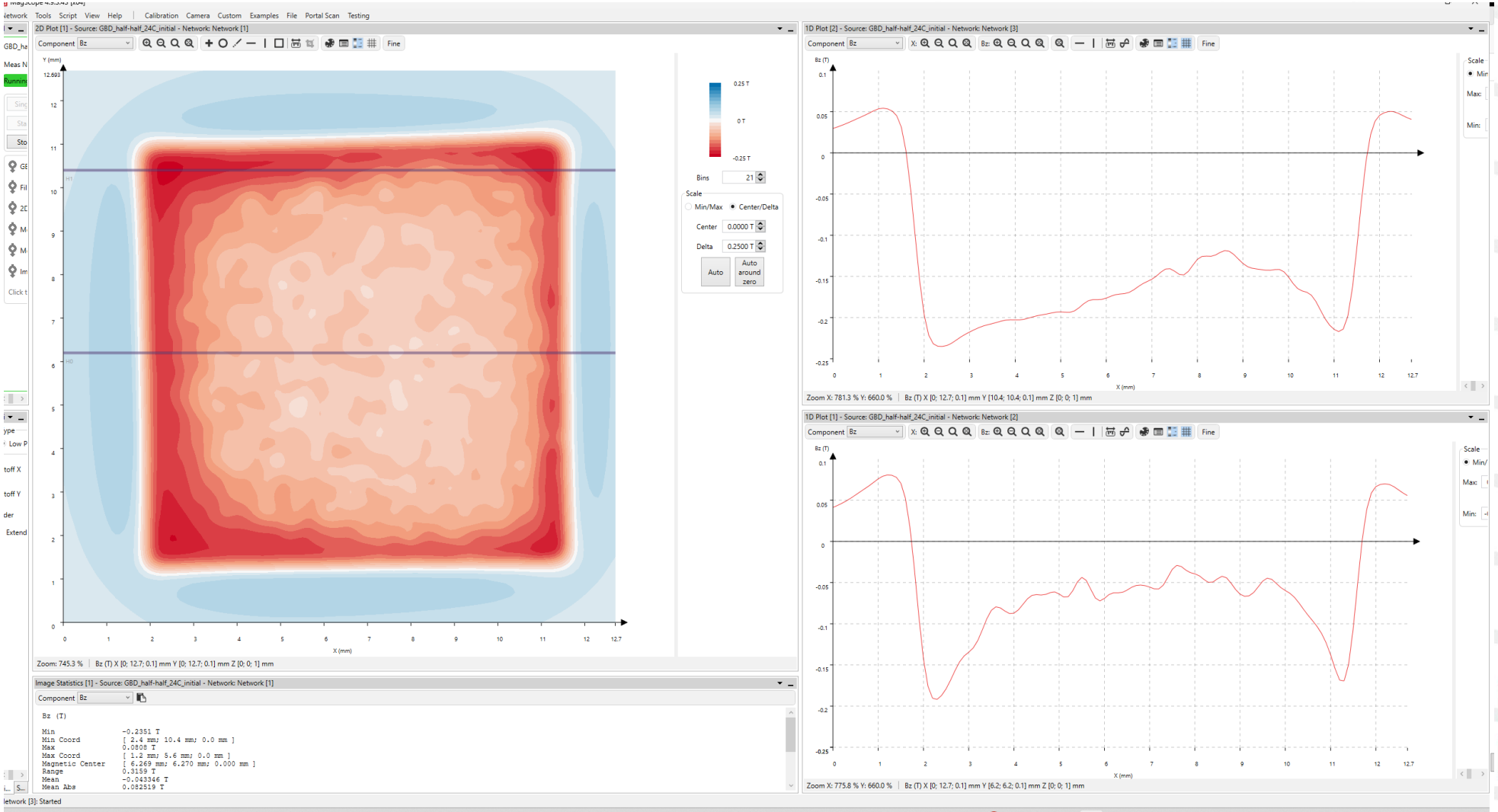
‘half-half’ sample, virgin 24°C



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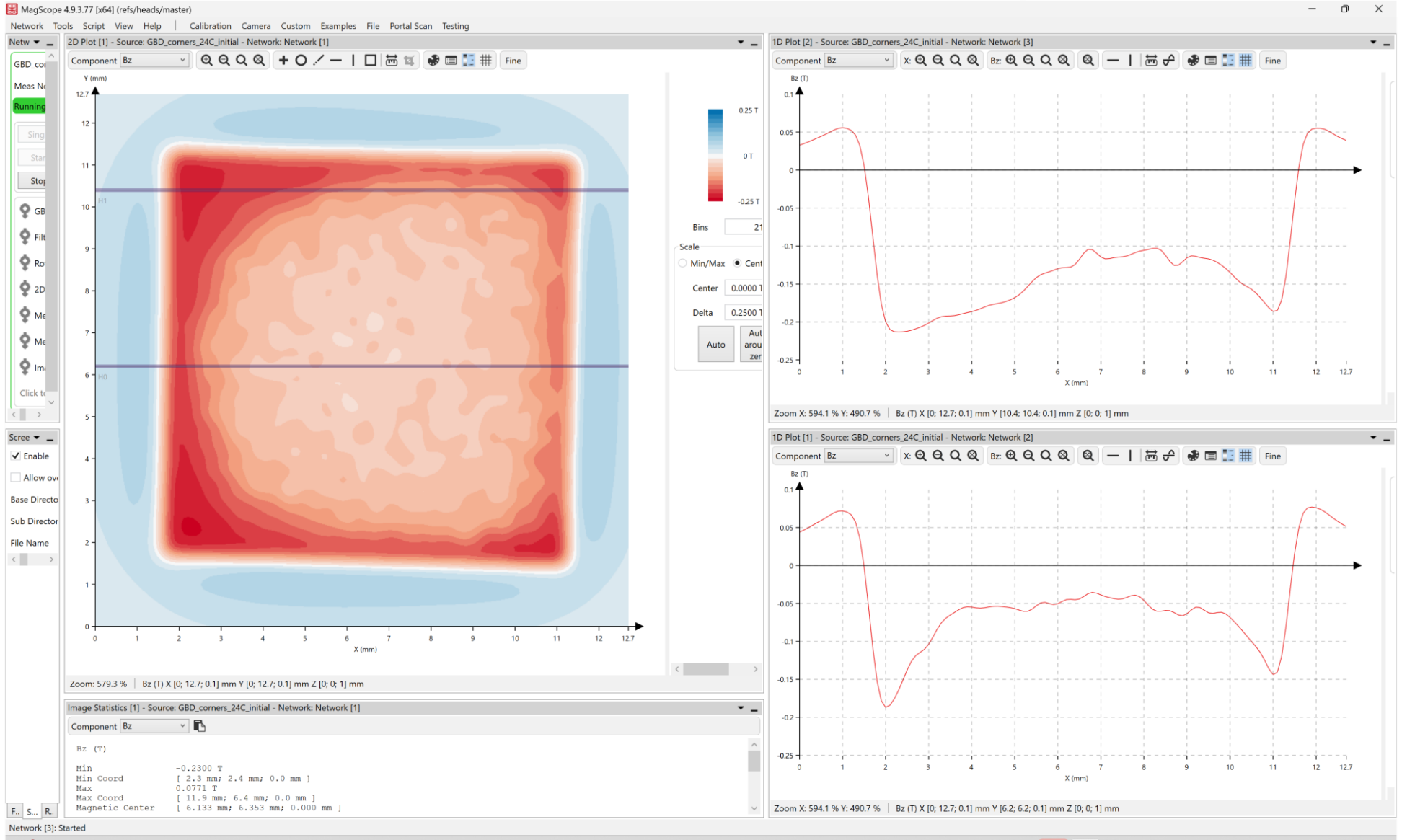
‘corners’ sample, virgin 24°C



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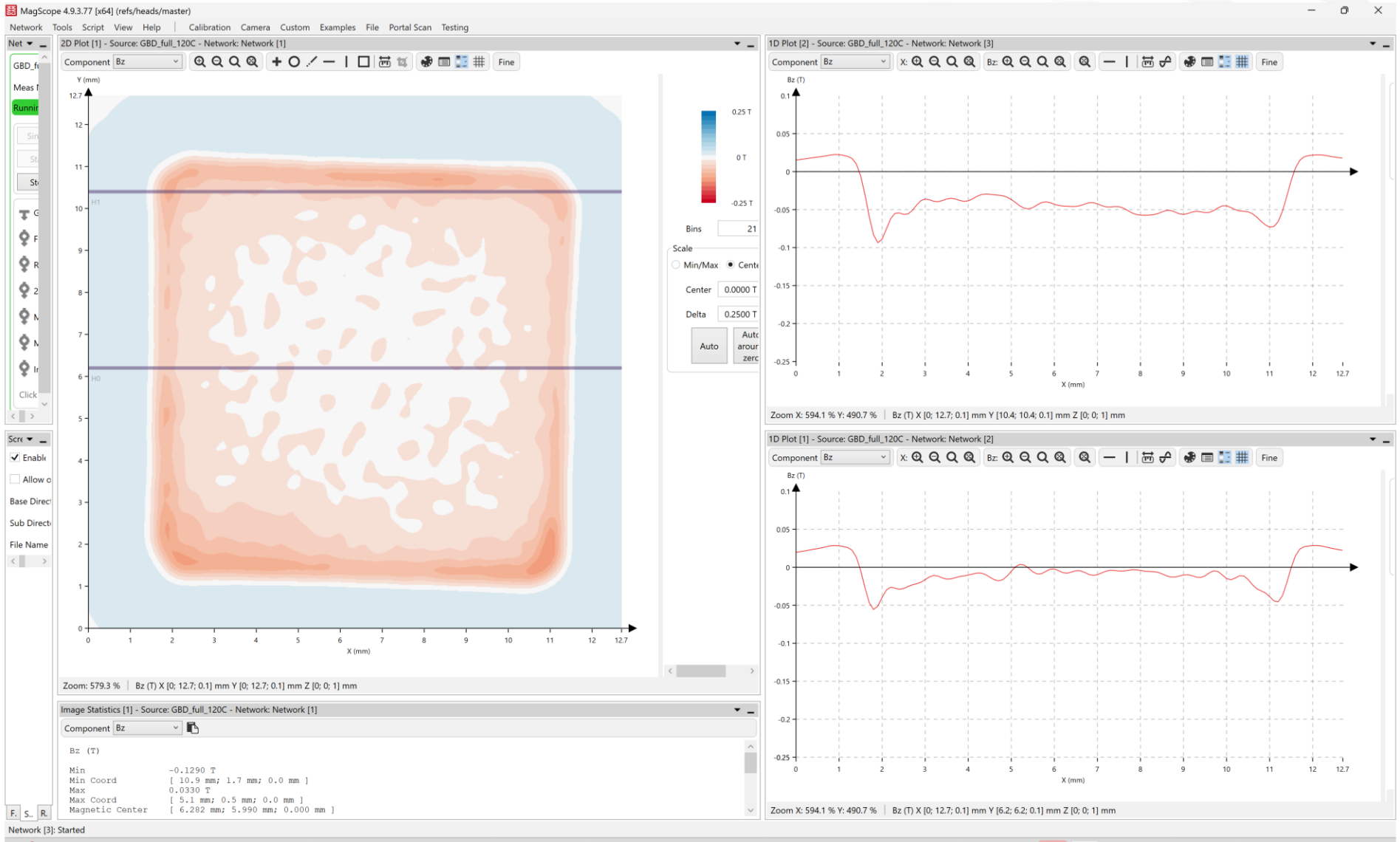
‘full’ sample, 120°C in-situ



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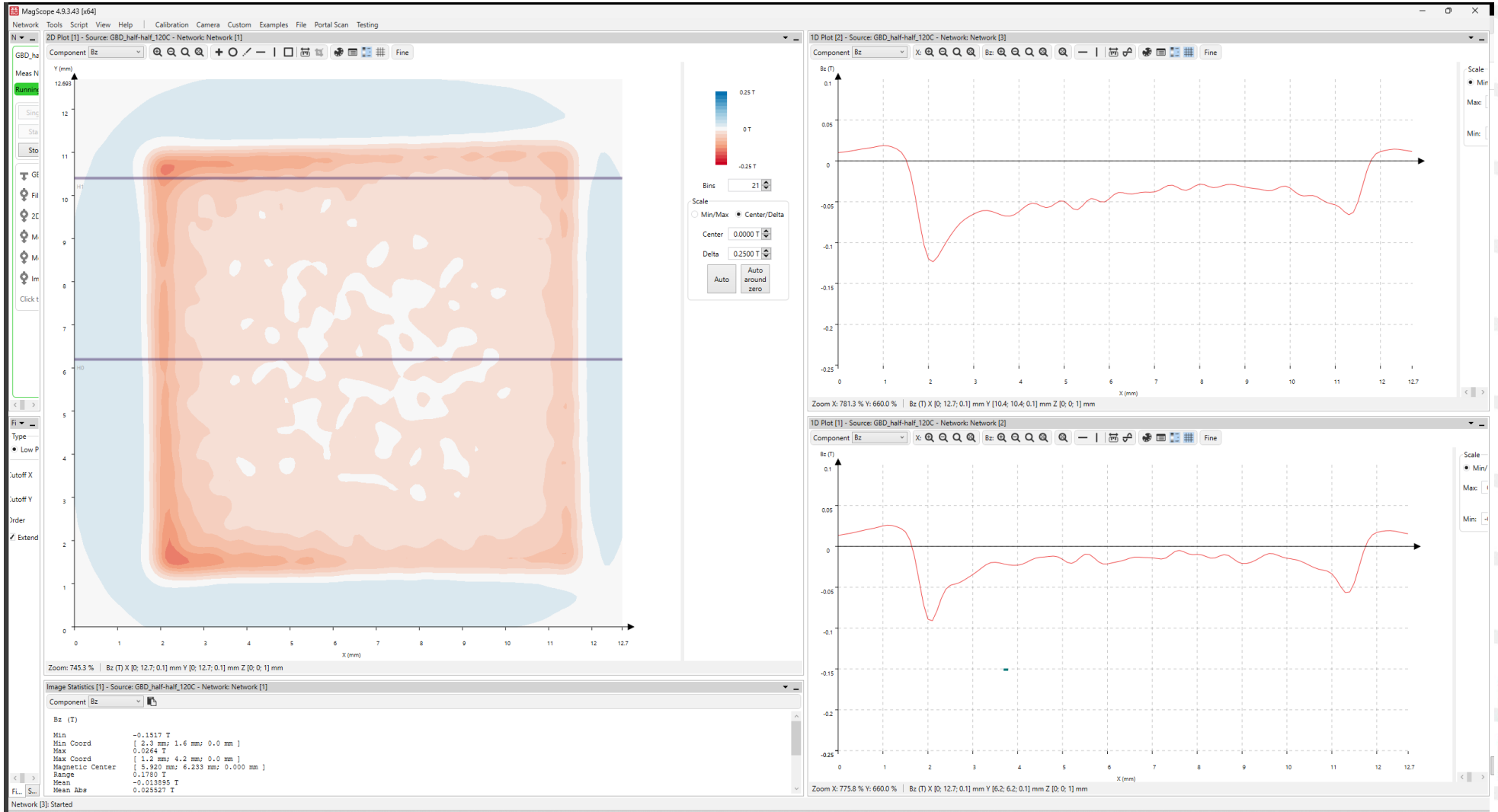
‘half-half’ sample, 120°C in-situ



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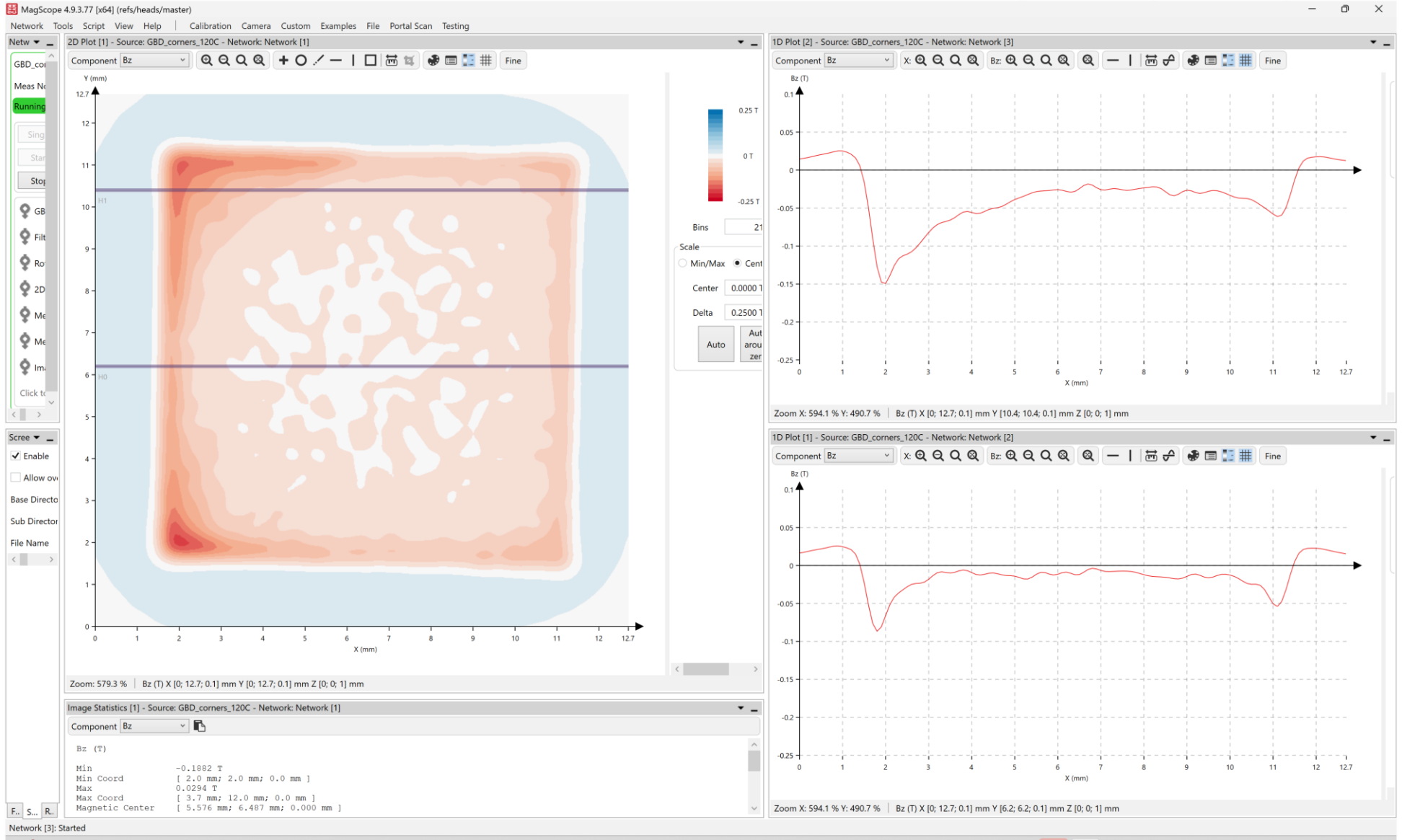
‘corners’ sample, 120°C in-situ



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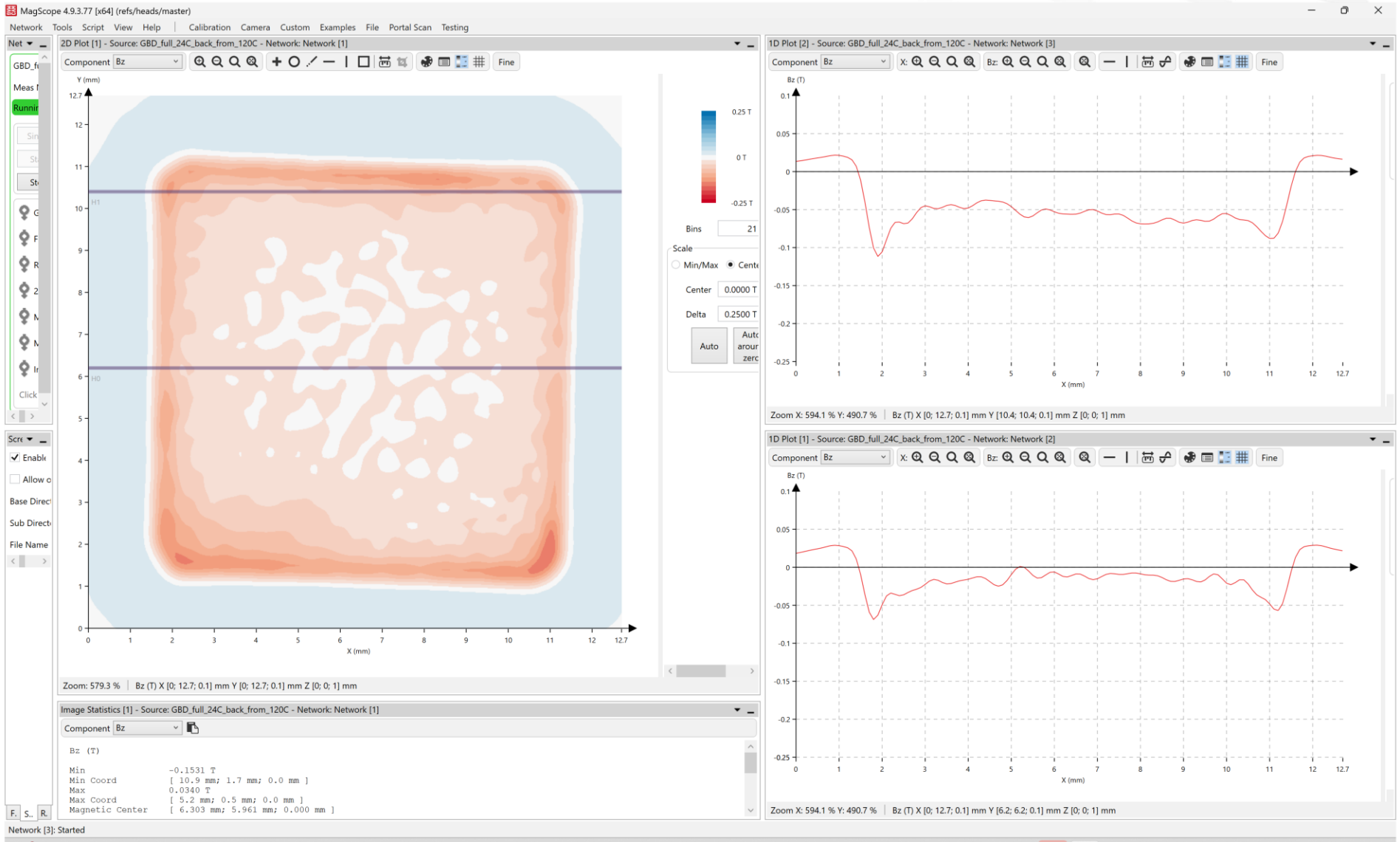
‘full’ sample, 24°C after 120°C



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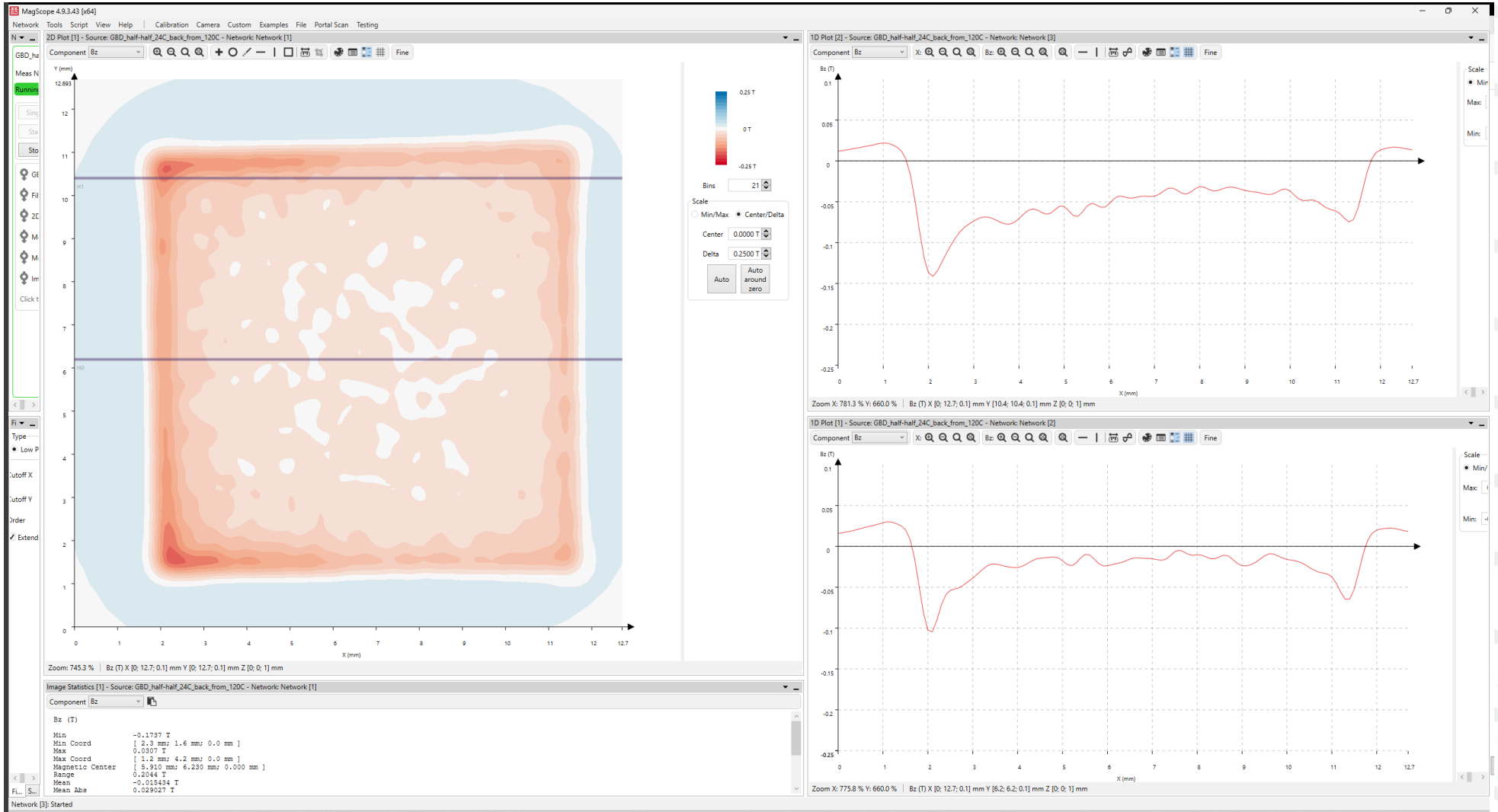
‘half-half’ sample, 24°C after 120°C



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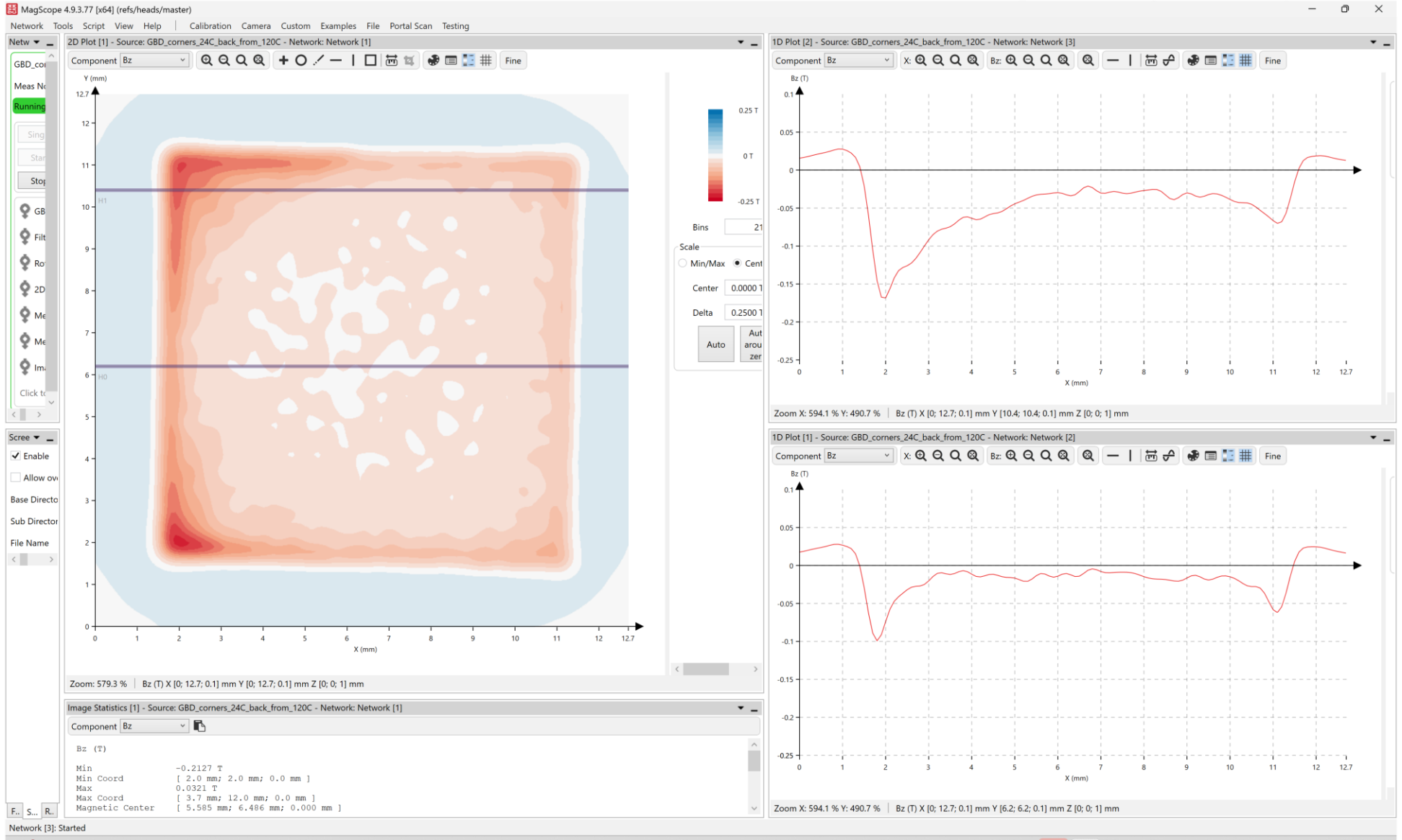
‘corners’ sample, 24°C after 120°C



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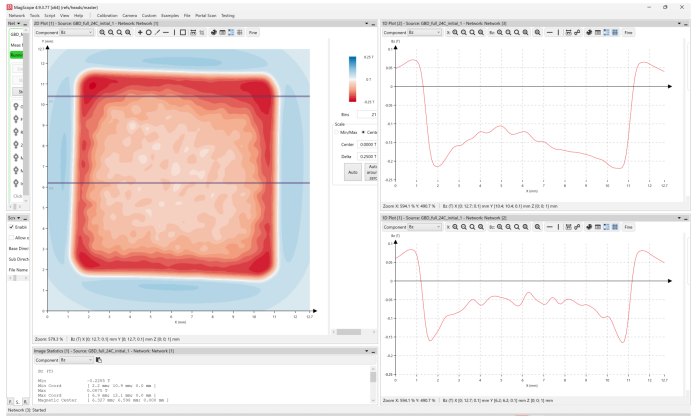
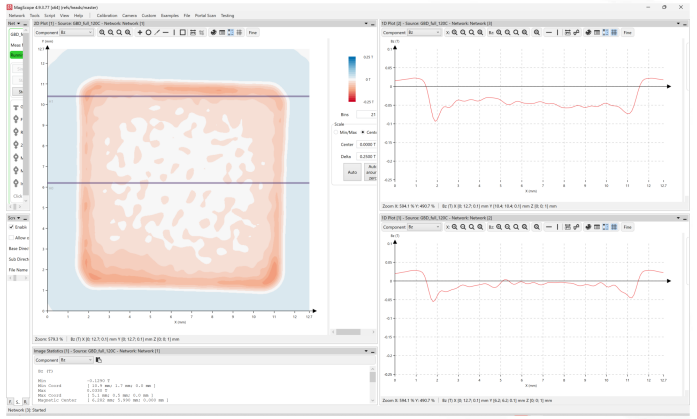
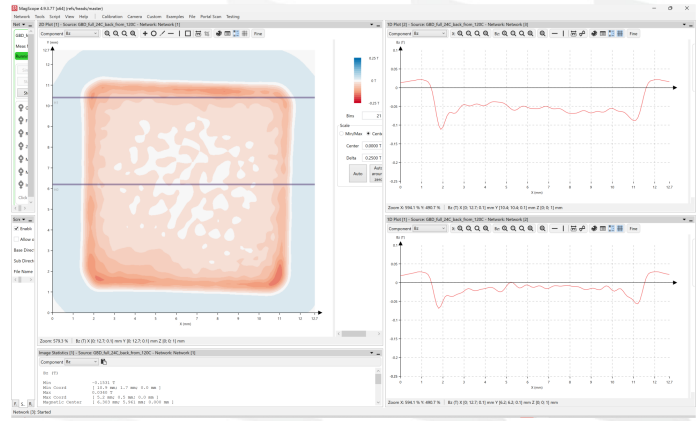
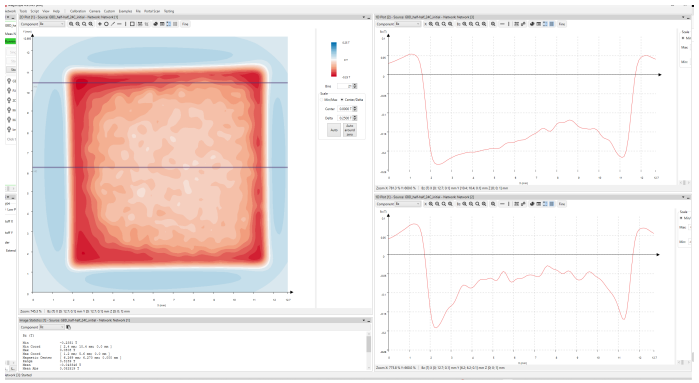
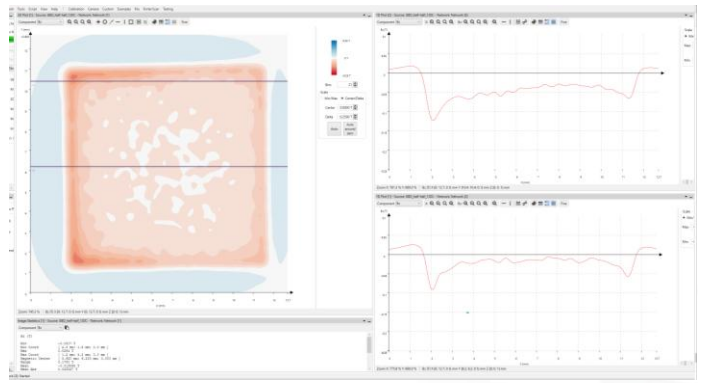
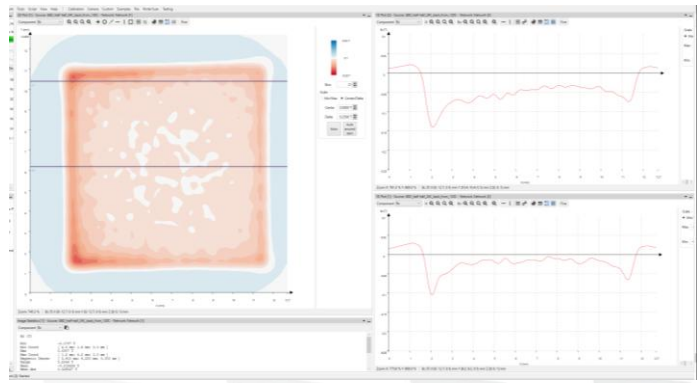
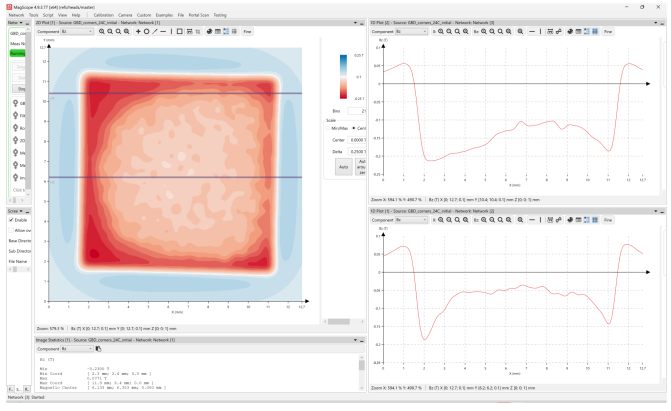
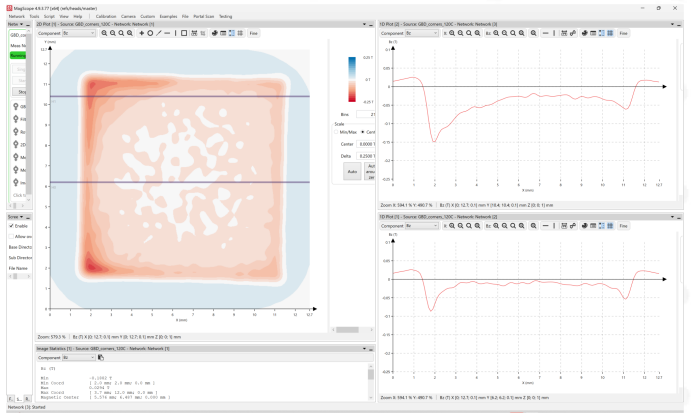
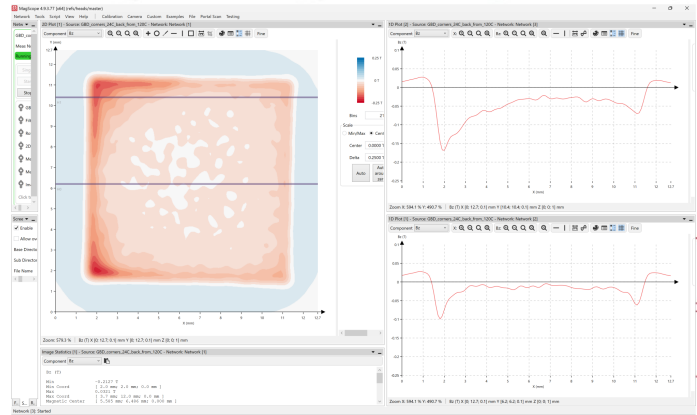
	24°C virgin	120°C in-situ	24°C after 120°C
‘full’			
‘half-half’			
‘corners’			

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Conclusions

- Magcam magnetic field mapping reveals localized magnetic properties of permanent magnets and magnet assemblies
- High-Temperature MiniCube3D magnetic field camera allows studying both in-situ and remanent magnet properties during thermal cycling
- Applied to recycled magnets to get fast feedback on magnet quality and get fast production process optimization

DOWNLOAD
CASE STUDY

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Unlock your magnets' secrets

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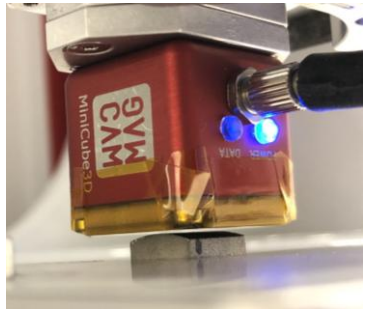
Individual magnet characterization

Theoretical magnet model fitting to measured magnetic field distributions

MagFit internal magnetization extraction

Measured magnetic field distribution



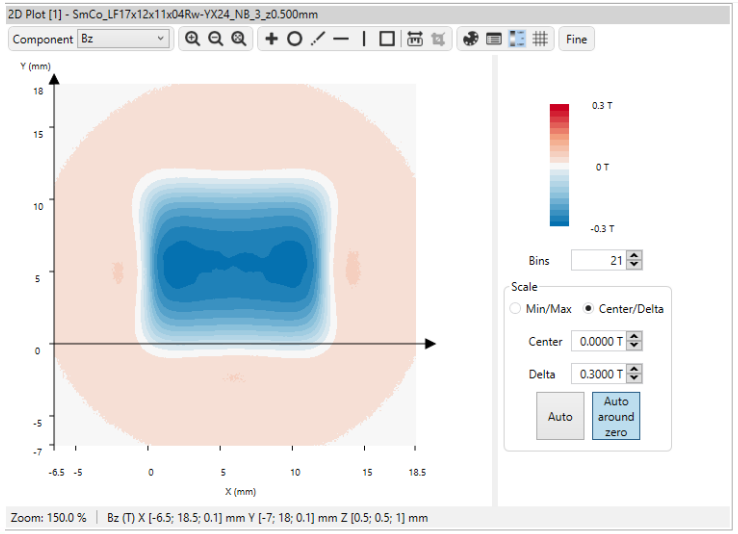
Best fit theoretical magnetic field distribution

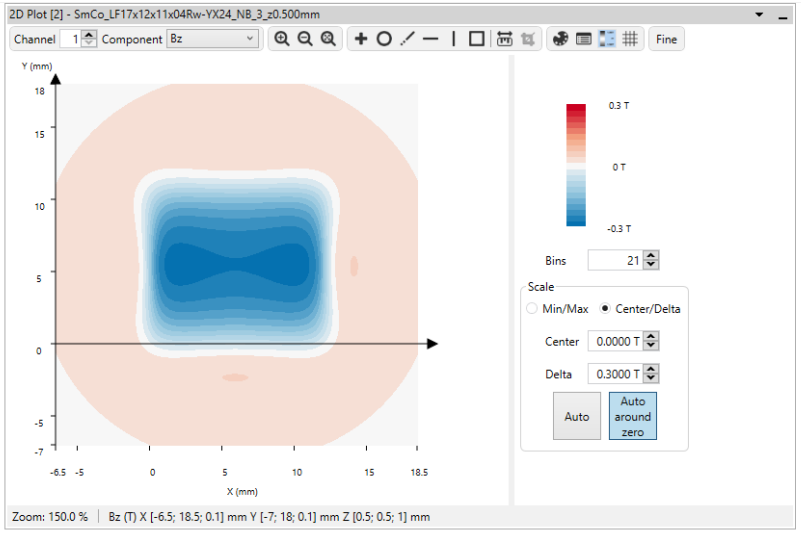
- Optimize model parameters

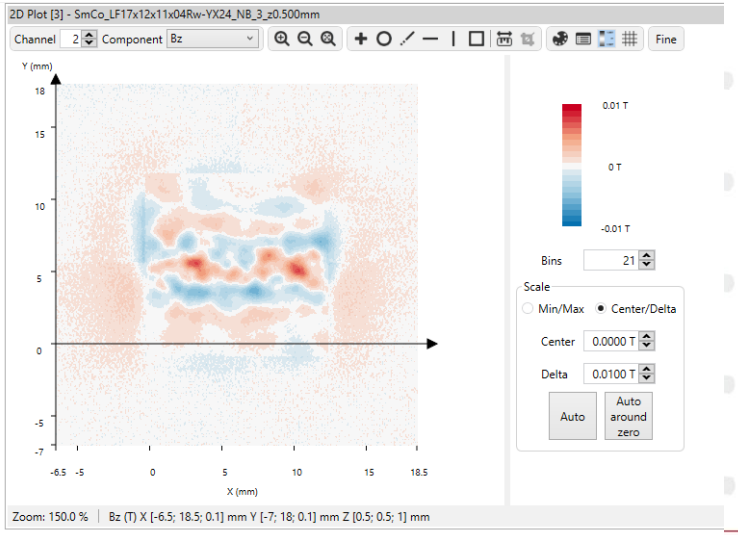
➔ = magnet properties (magnetization, angle deviation, ...)

Residual magnetic field distribution

- Minimized sum of squares
- Map of magnetization homogeneity



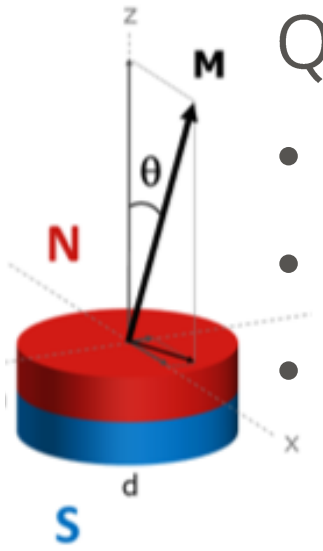




Theoretical magnet model parameters

Magnet geometry: block # blocks: 1

	Initial	Unit	Fit
a	35	mm	☑
b	14	mm	☑
c	6	mm	☐
n/a	0.1000	mm	☐
Mx	0	T	☑
My	0	T	☑
Mz	0	T	☑
x-position	17.5000	mm	☑
y-position	7	mm	☑
Meas. height	0.5000	mm	☑
alpha-position	0	°	☑



Quantitative analysis:

- Magnetization M
- Angle error θ
- Homogeneity map

$$M = \sqrt{M_x^2 + M_y^2 + M_z^2}$$

$$\theta = cos^{-1}\left(\frac{M_z}{\|M\|}\right)$$