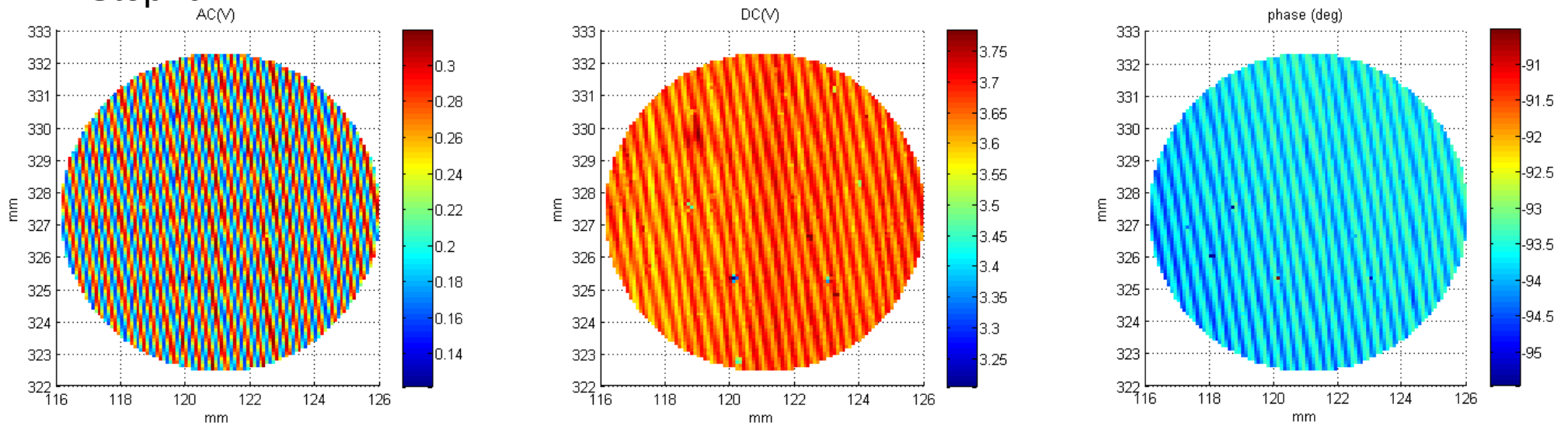# Problem with the surface reference sample

Test the surface reference sample in order to check if it had any damage

Diameter: 10 mm
Step: 0.1mm

 - AC signal (expected to be proportional to the absorption), has periodic oscillations by a factor of ~2
 - DC and phase are pretty constant but follow the same pattern
 - Looks like real absorption
 - Looks like the sample is damaged and absorption is not uniform
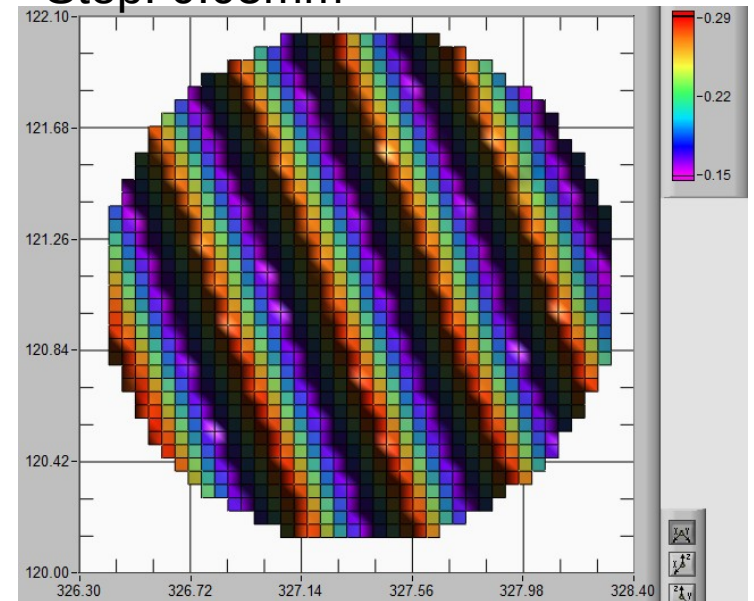
Made a smaller and more resolved map around the center
Then rotated the sample by 90° and the pattern rotates.
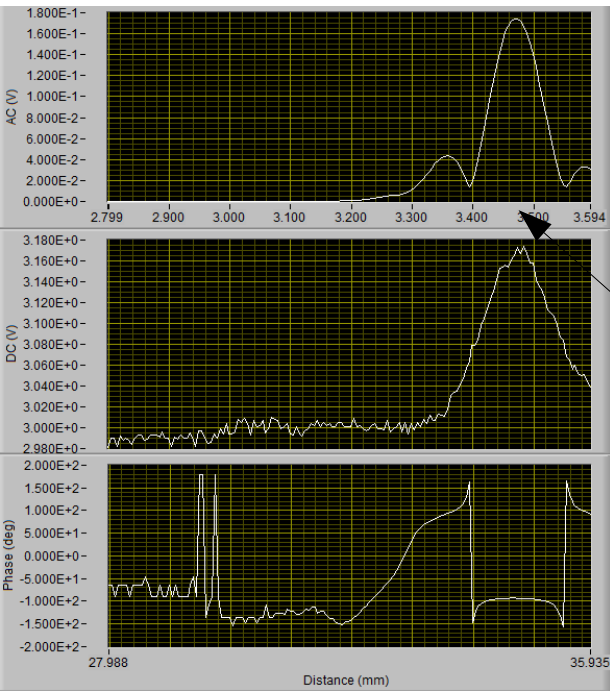
Diameter: 2mm
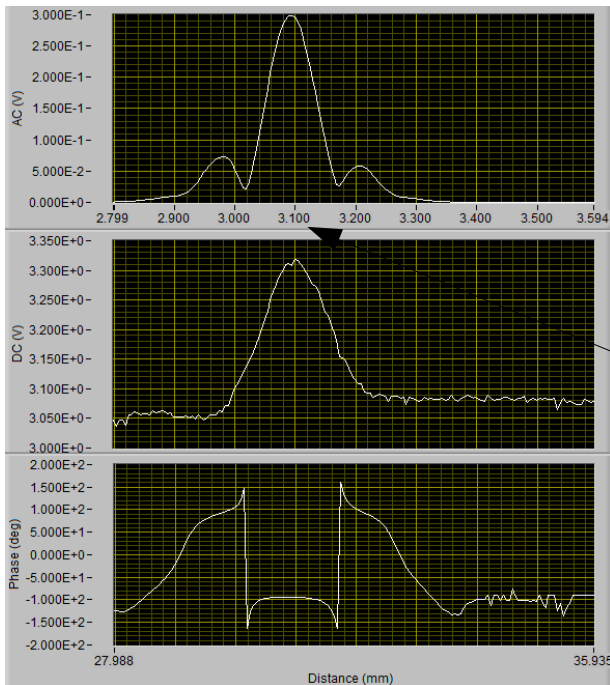Step: 0.05mm
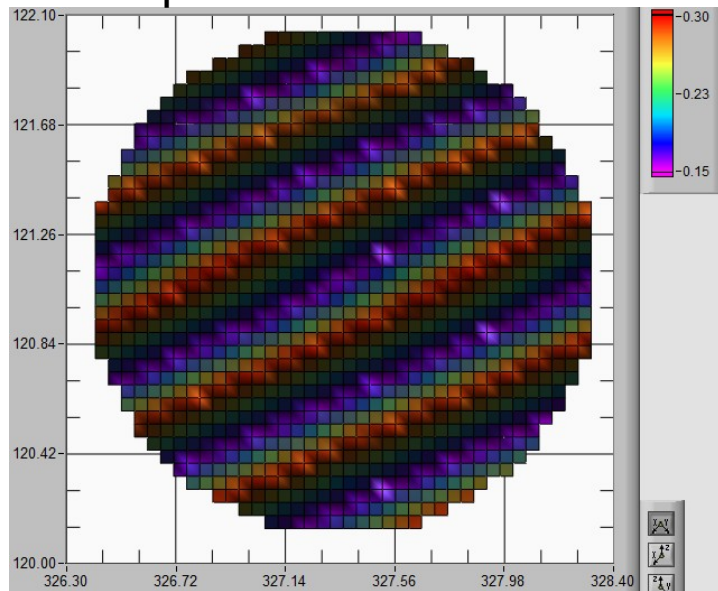
Rotated by 90°

Diameter: 2mm
Step: 0.05mm

- Looks like the problem is in the sample
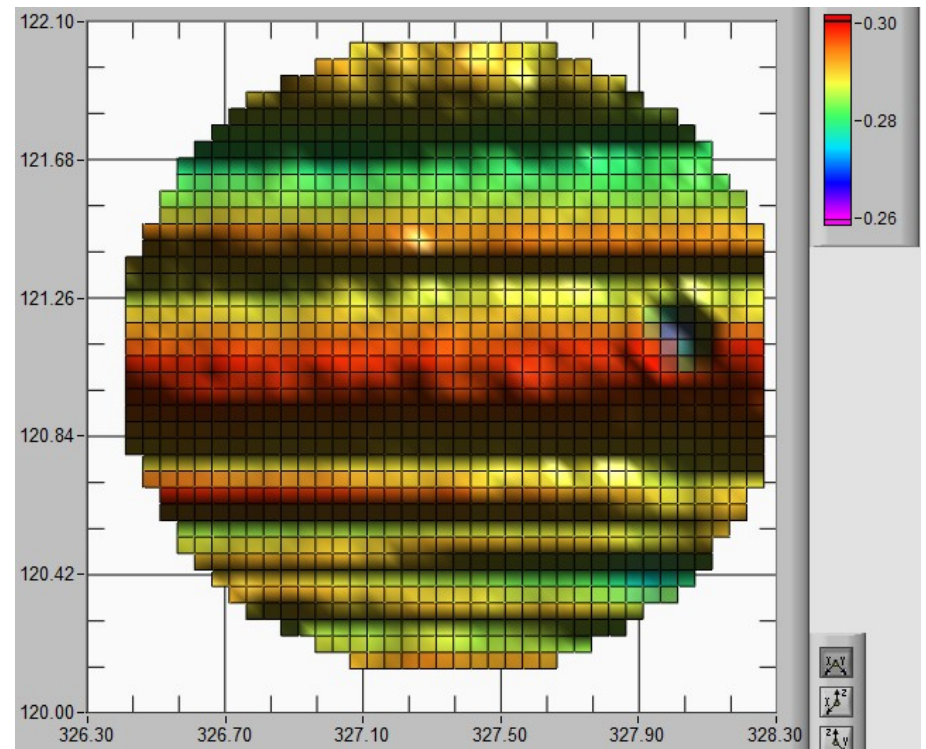
- Flipped the sample and made a new scan
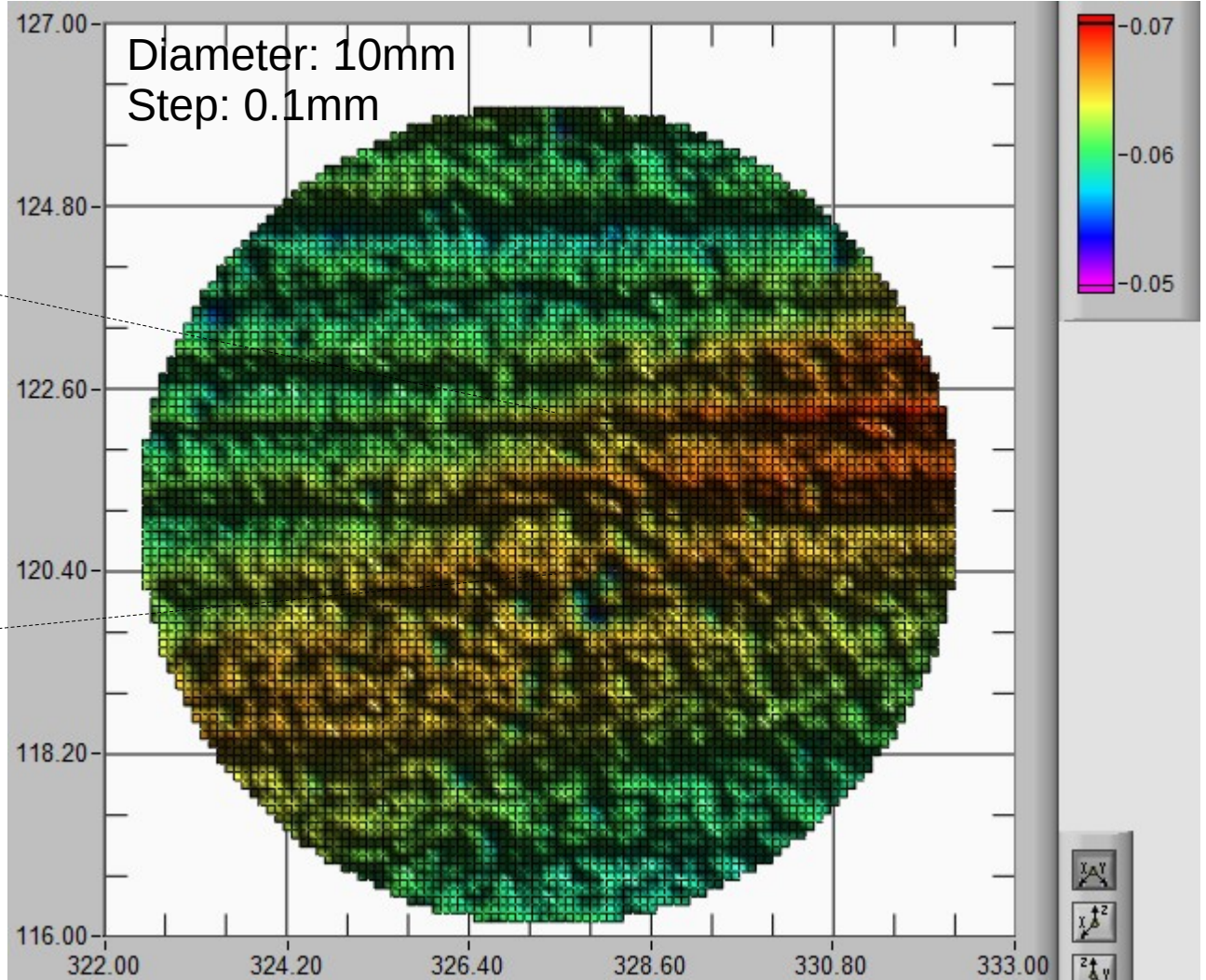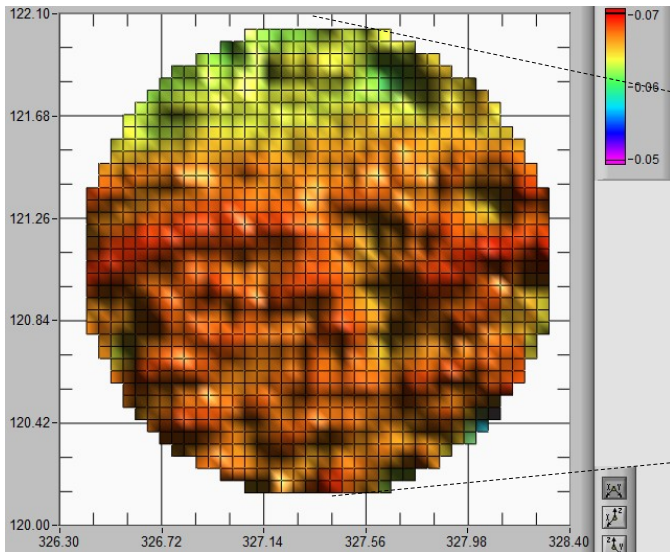
Z=34.7mm

Z=30.9mm

- Moved the sample to the new maximum position and made a map

The pattern is a bit different and with lower amplitude

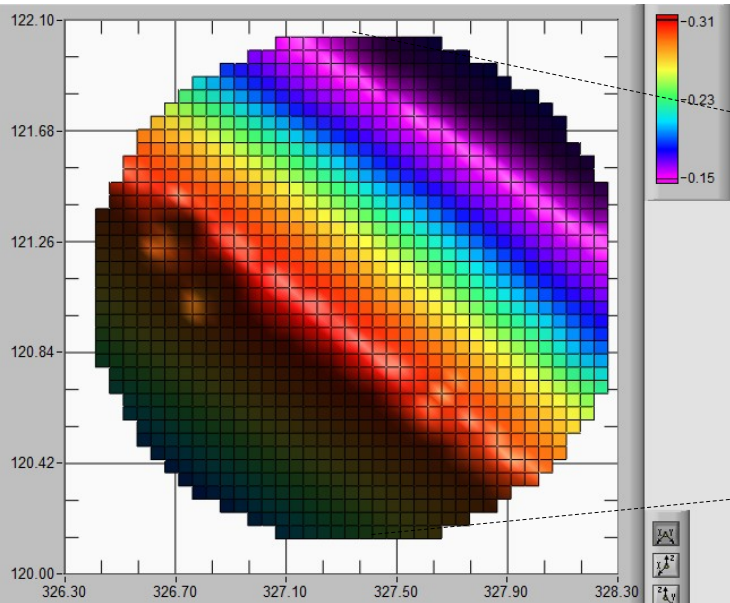# Check if the same pattern is in the **bulk reference** sample

Diameter: 2mm
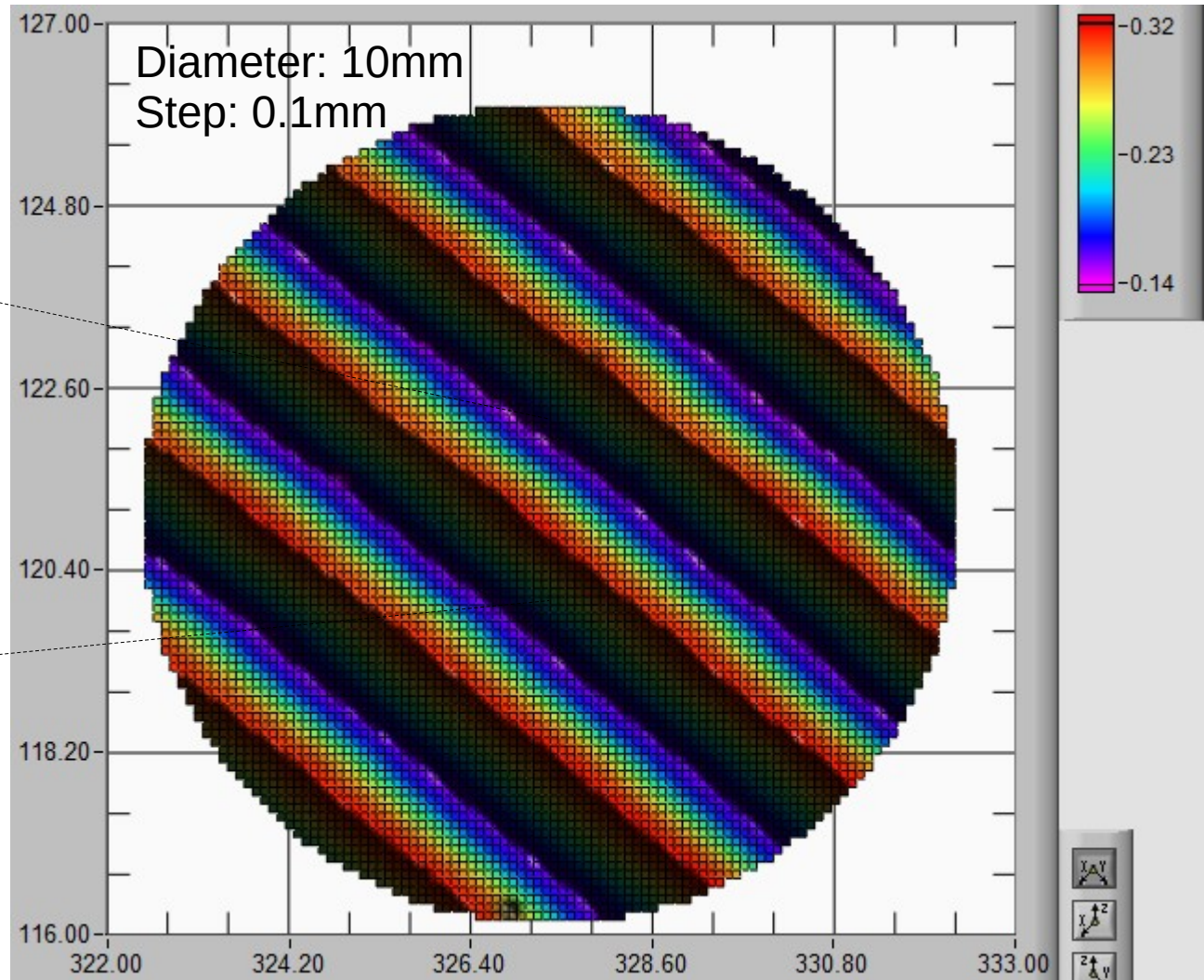Step: 0.05mm

Diameter: 10mm
Step: 0.1mm

THE PATTERN DOESN'T SHOW IN THE BULK REFERENCE SAMPLE

Bought a **NEW surface reference** sample:
Optical density 0.2 filter from Newport (model: FRQ-ND02)

Diameter: 2mm
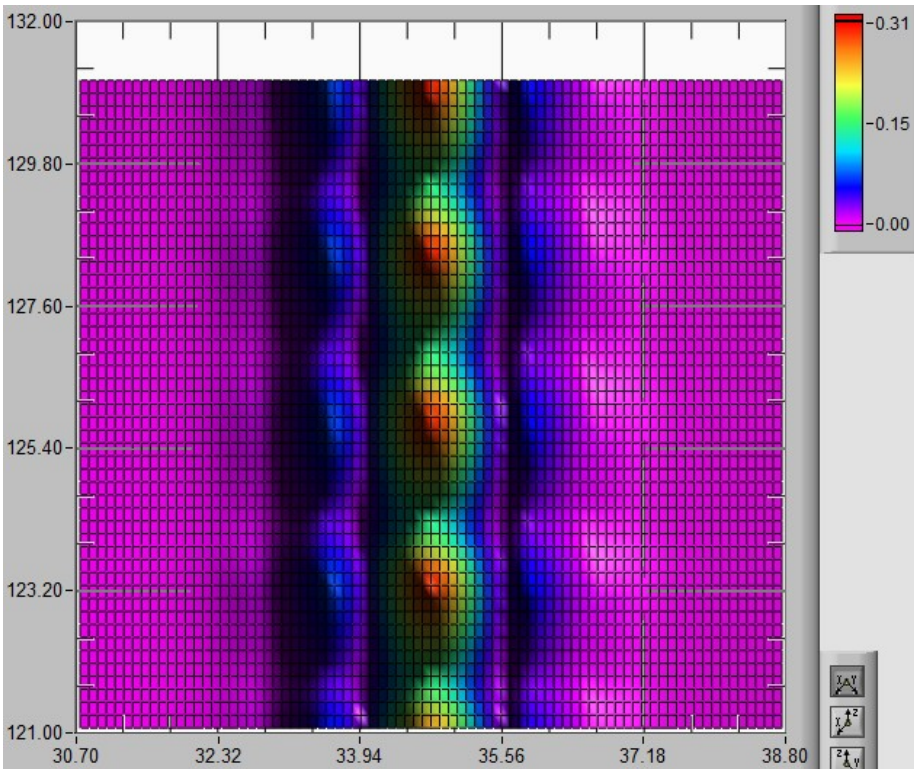Step: 0.05mm

Diameter: 10mm
Step: 0.1mm

Also the new sample shows a similar pattern but with larger fringes separation:
  - **New sample: 5 fringes/cm**
  - **Old sampe: 25 fringes/cm**

NEW surface reference sample

Map along Y and Z axis

This map shows the cross section of the coating
with the absorption fringes
(like many scans along Z for different Y positions)

 - The damage reason is excluded by the fact that we can see a similar pattern
on the new sample.
 - Another possible reason is the wedge of the sample, which is different for
different samples, in combination with a misalignment. Although the specs say:
 wedge < 3 arc min
- I will try to make a better alignment of the crossing point and see is
something changes