QM update

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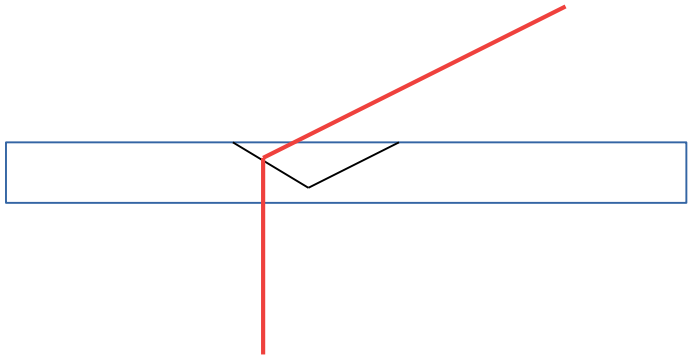
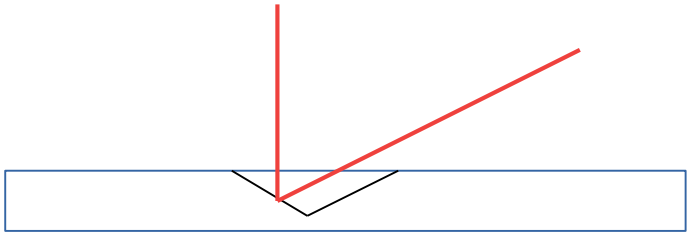
Scattering / Transmission

- Want to Find a Front Back asymettry
- Dark Spots are caused when backlighting is scattered away from the lens.

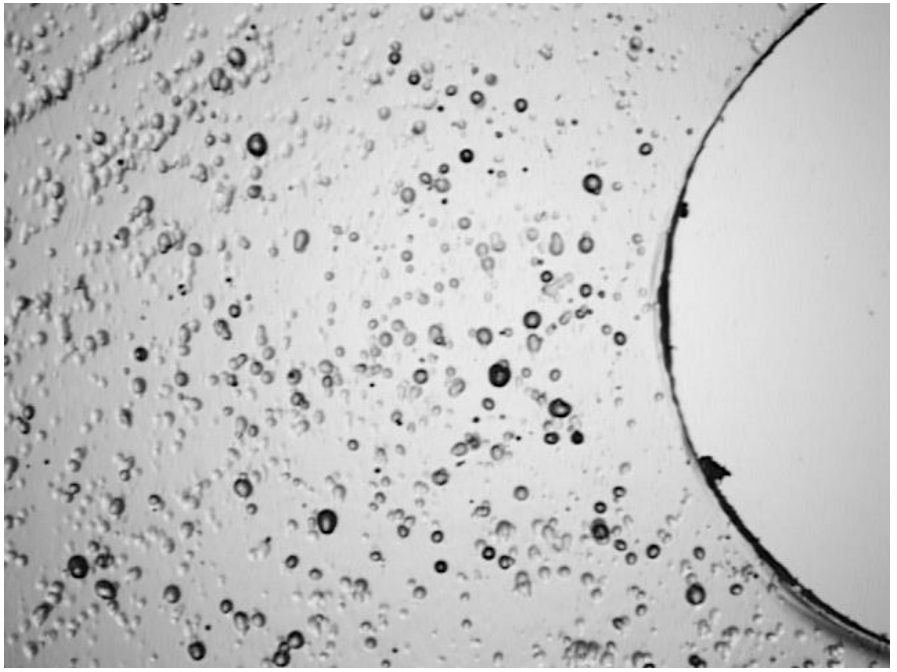


- HYPOTHESIS: Halo lighting on front surface holes will cause aditional illumination due to light scattering INTO th lens

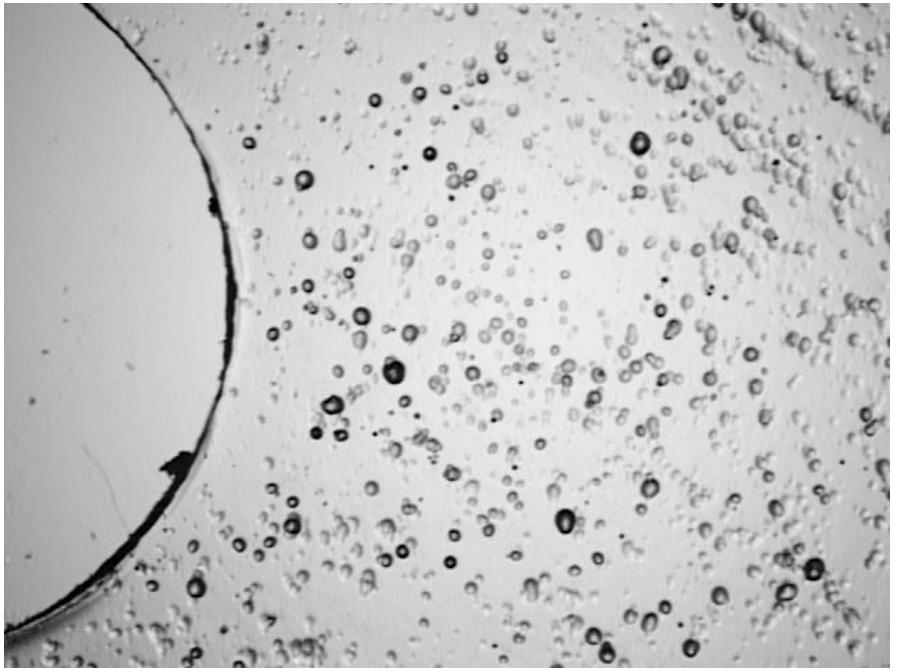


Front / Back comparison Study

Makrofol
‘Correct Alignment’ - (foil numbering up)
Backlighting

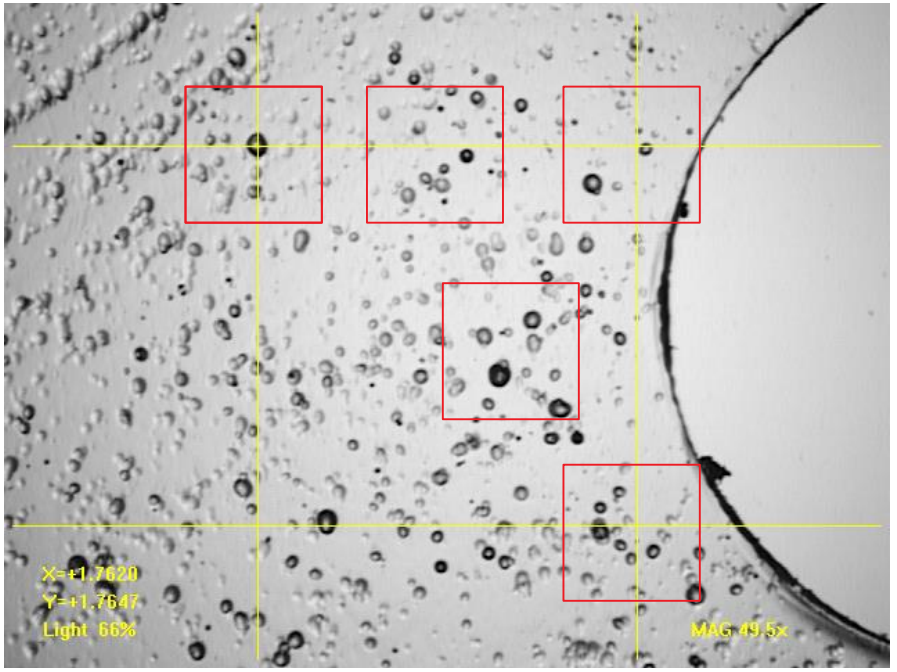


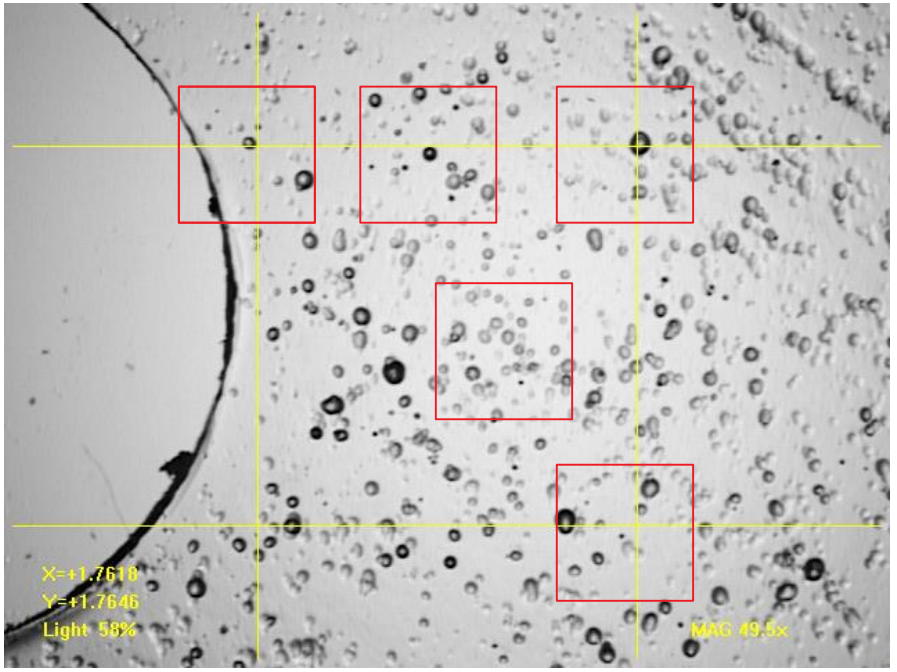
Makrofol
‘Reverse-side-flipped’
Backlighting



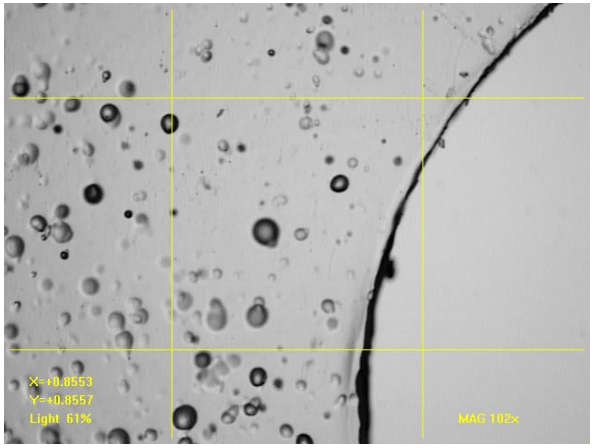
Front / Back comparison Study

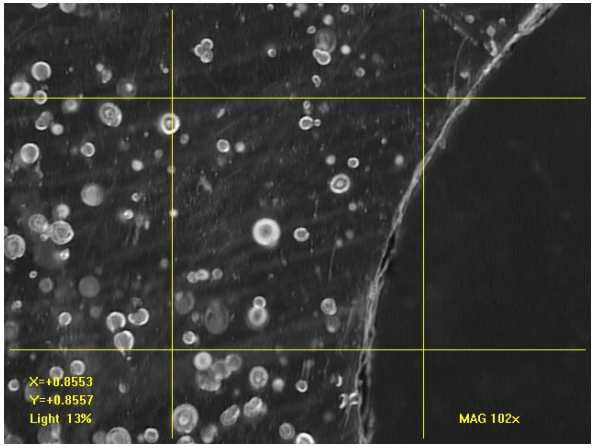
Align Using Target and reference holes
Define regions of interest / closer study

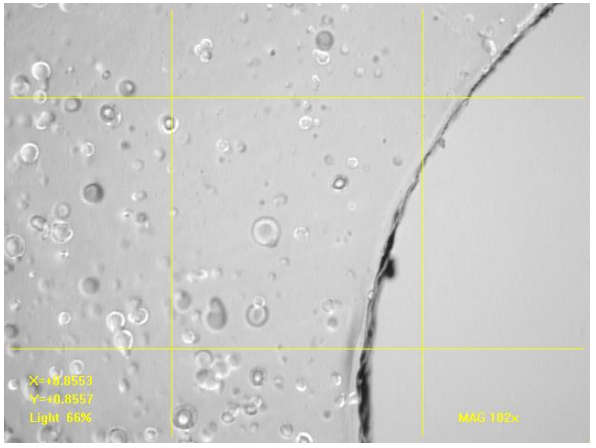


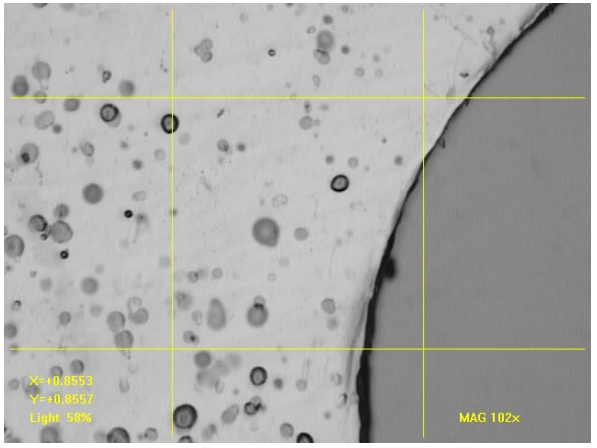


Imaging Parameters







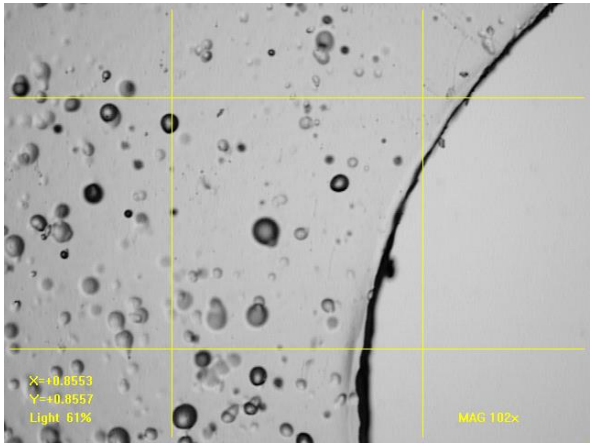


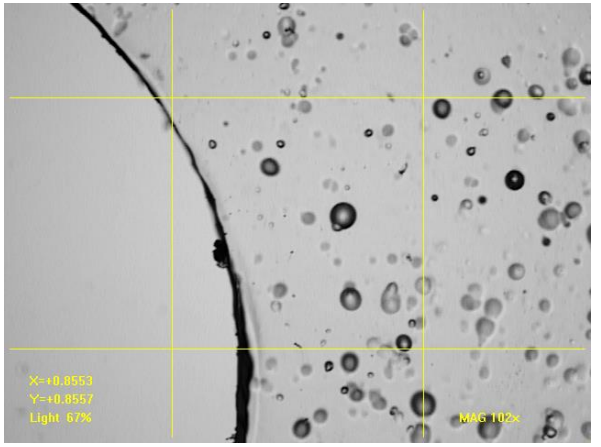
Backlighting = 60
Halo lighting = 150
Backlight + Halo
Lens Lighting = 15

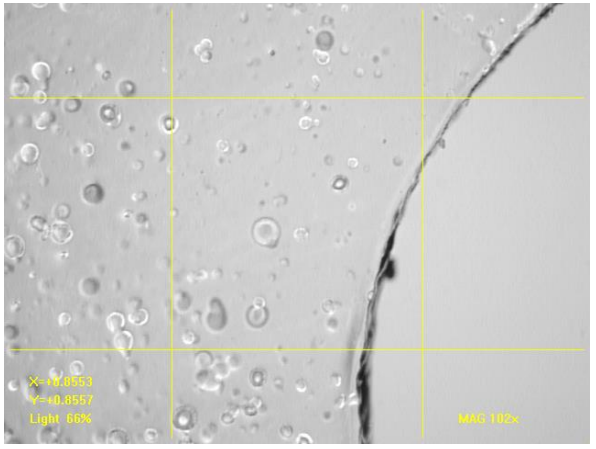
Same approx light level
In all cases but halo

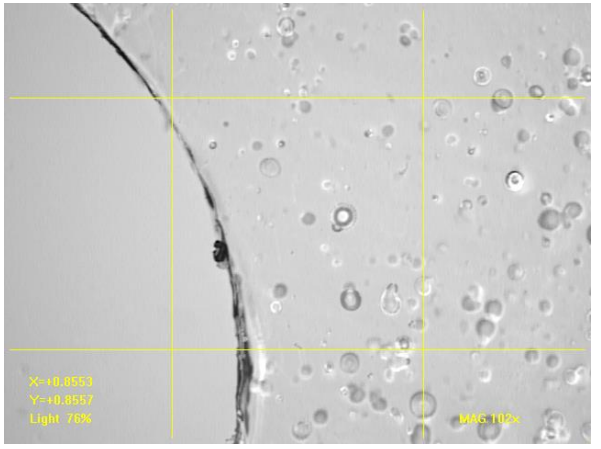
Zoom = 102x

Top Right Corner



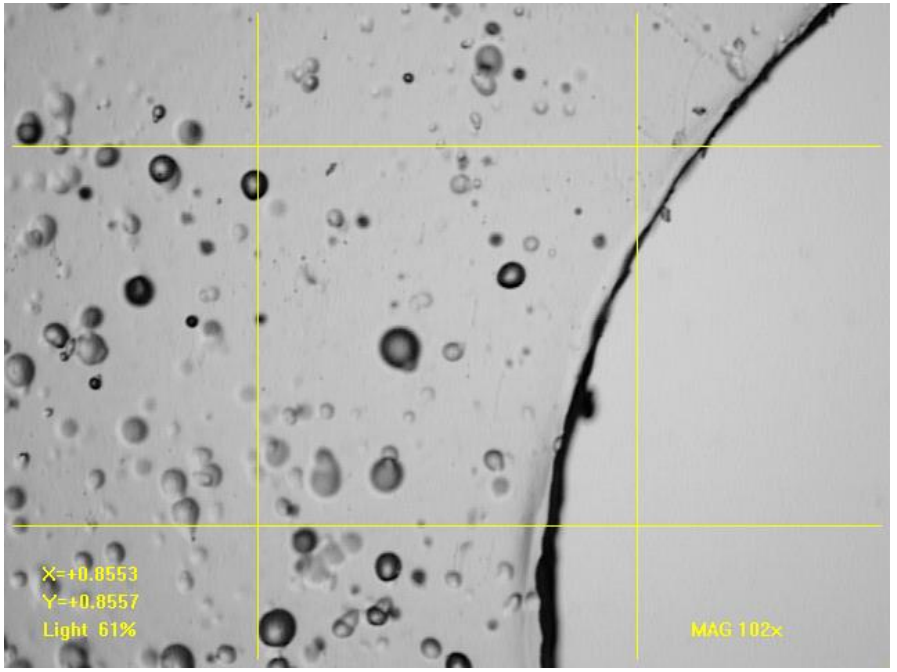


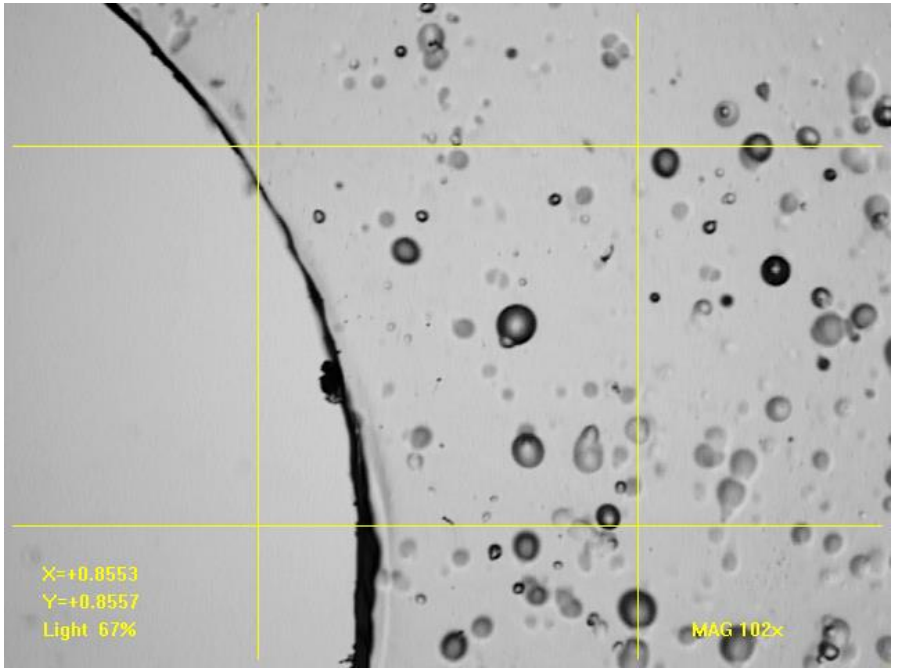




TRC - Backlighting

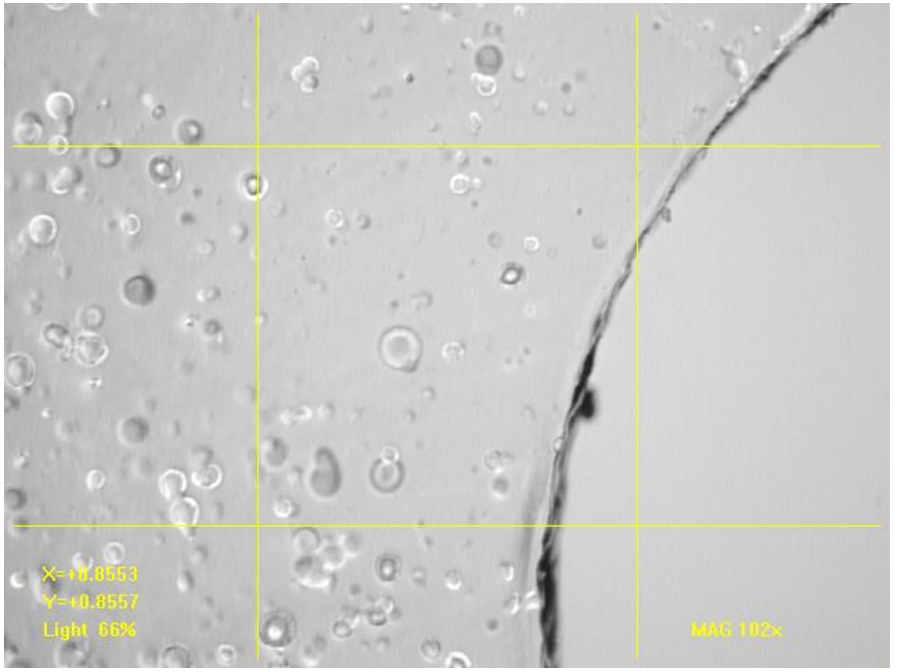
No clear difference
Relative symettry between front and reverse.

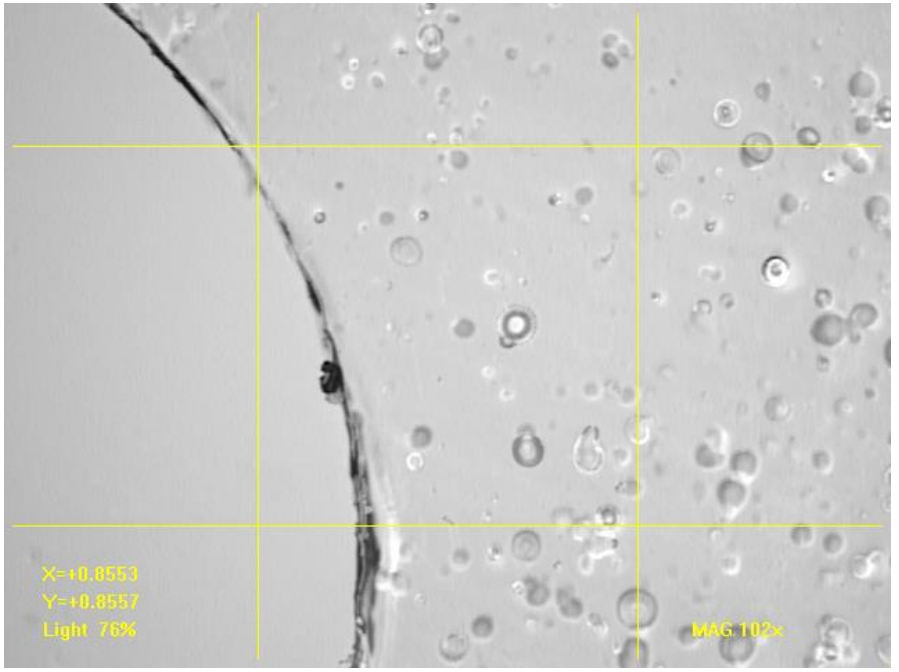




TRC – BackLight + halo

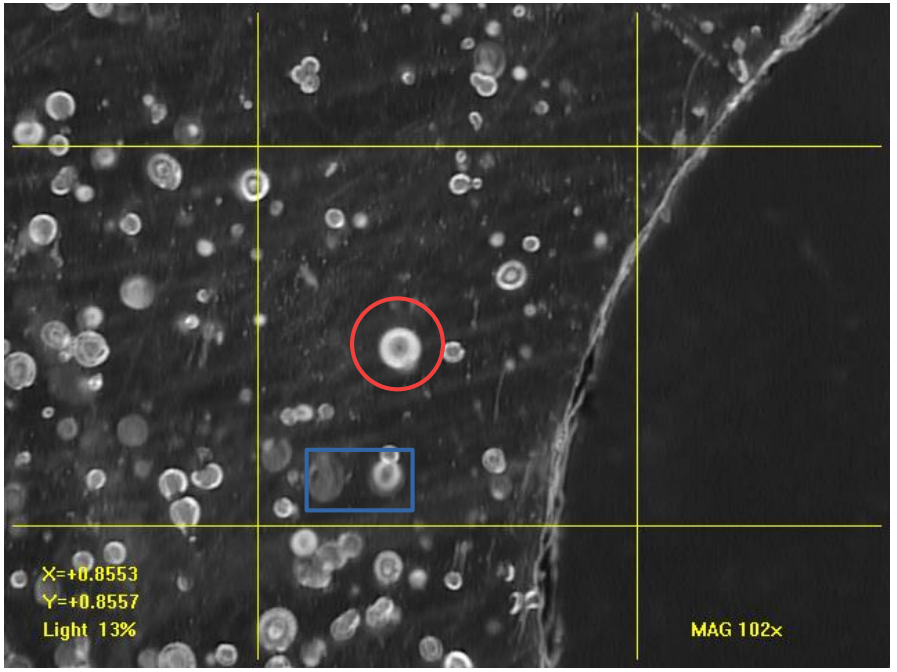
Bright spots in multiple holes,
Bright spots on front largely correspond to Dark spots on reverse, Vice Versa
Supports scattering and transmission hypothesis

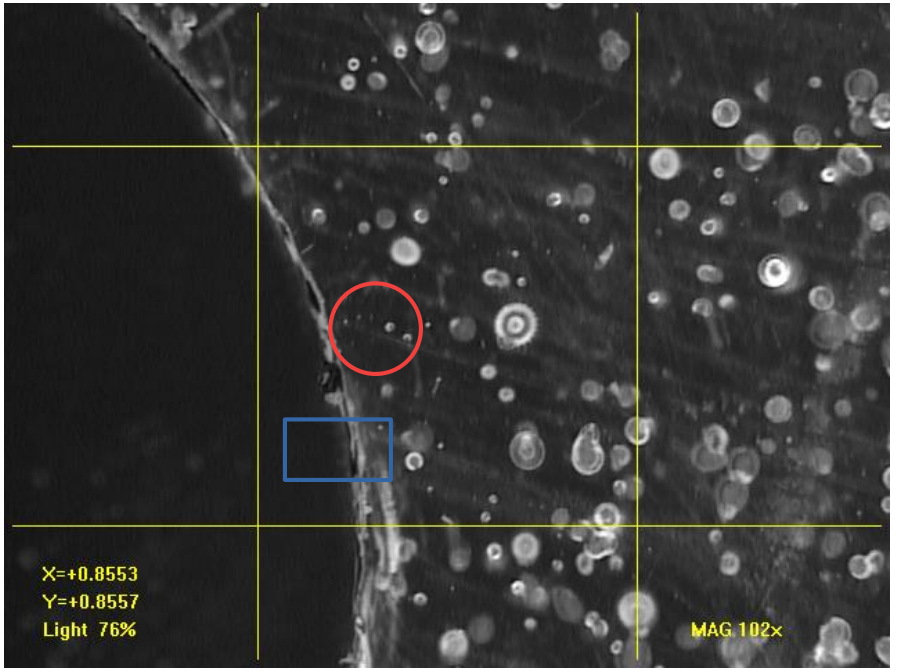




TRC – Halo

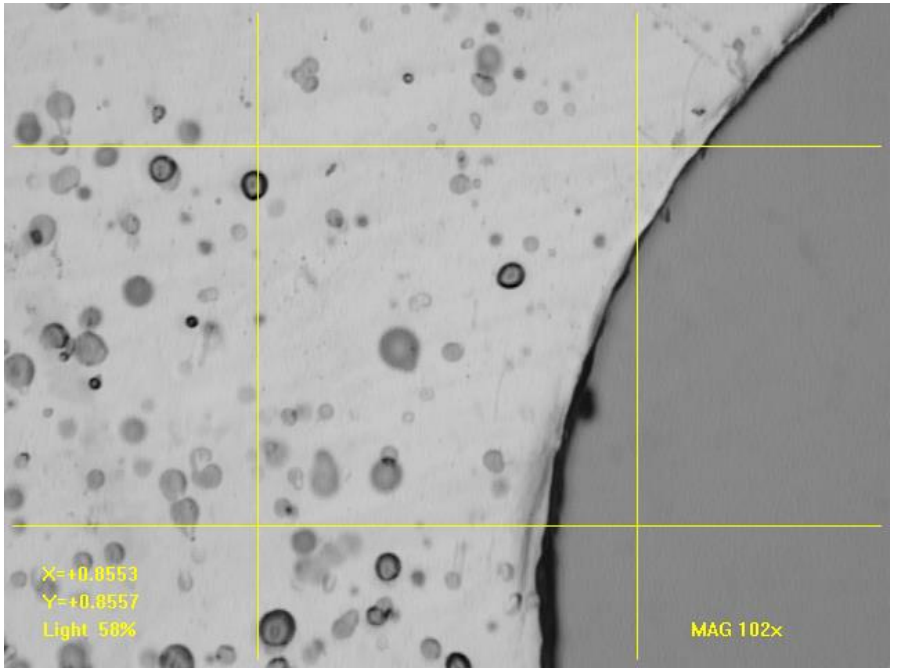
Red – Example of hole appearing Highlighted on both sides
Blue – Example of two holes, one highlighted on one side only

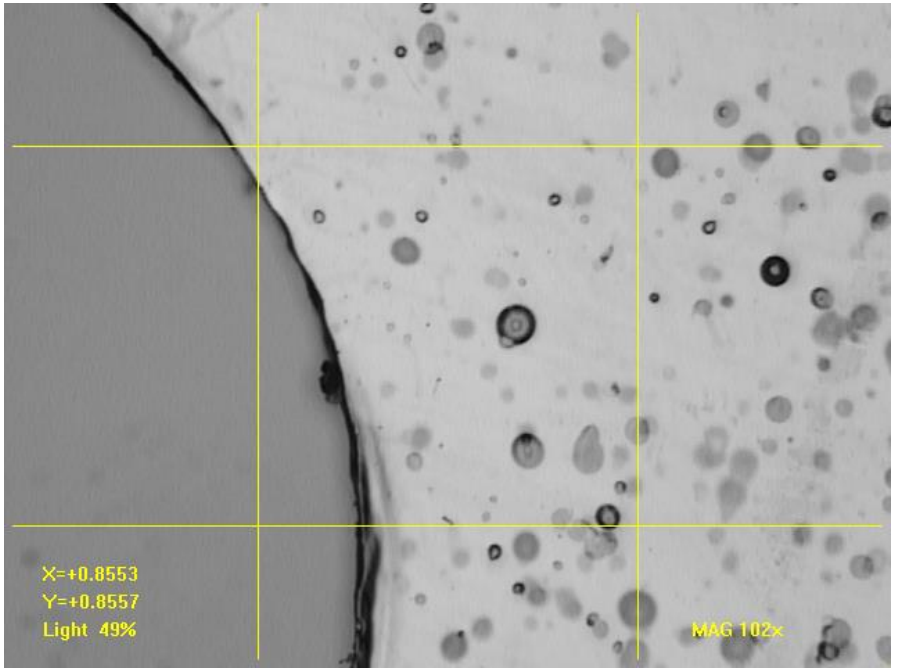




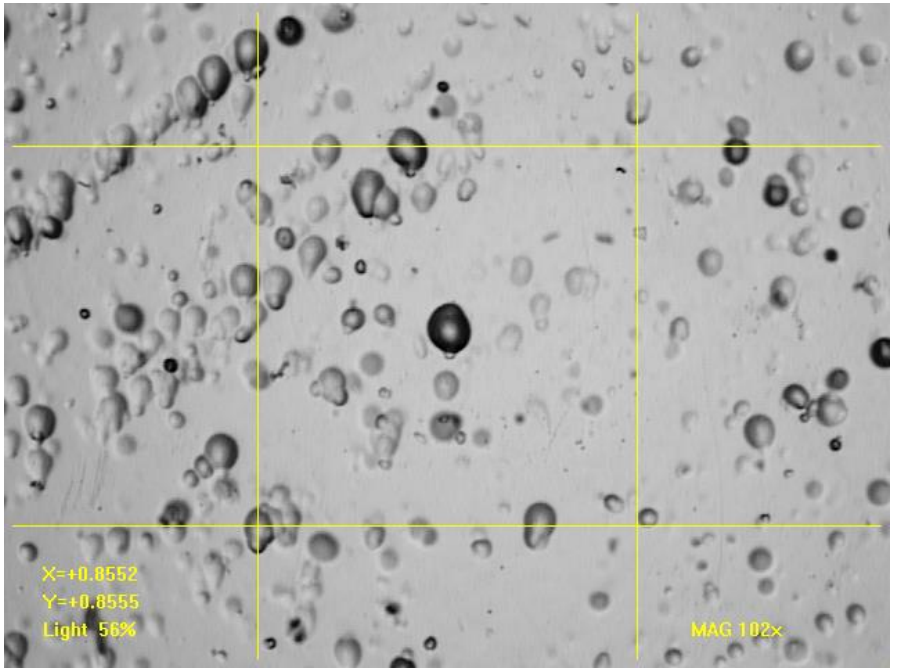
TRC – Through Lens

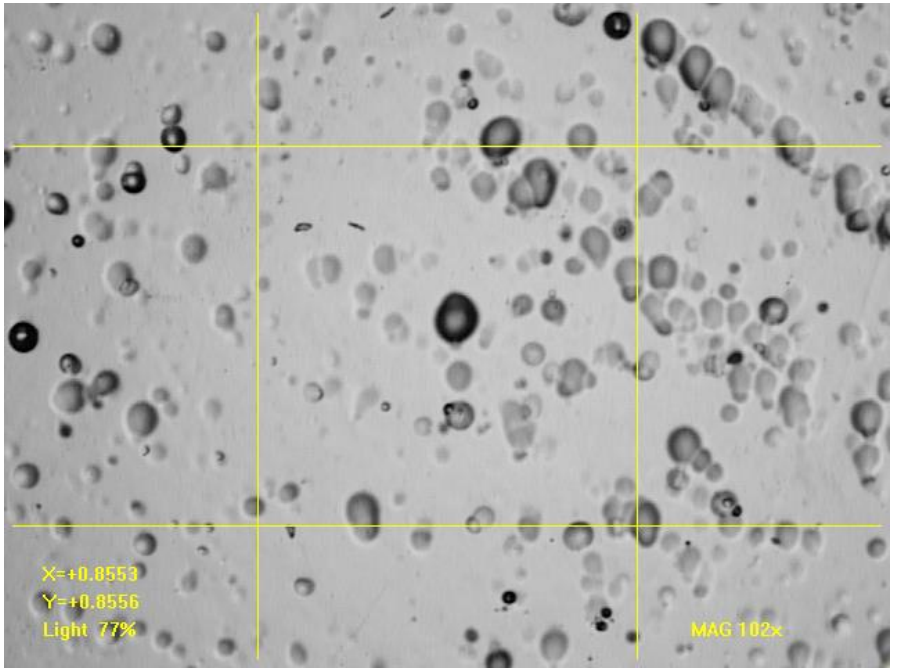
Brightness variation quite sensitive to focal plane
Brightly Illuminated pits under halo lighting, correspond to dark spots here.





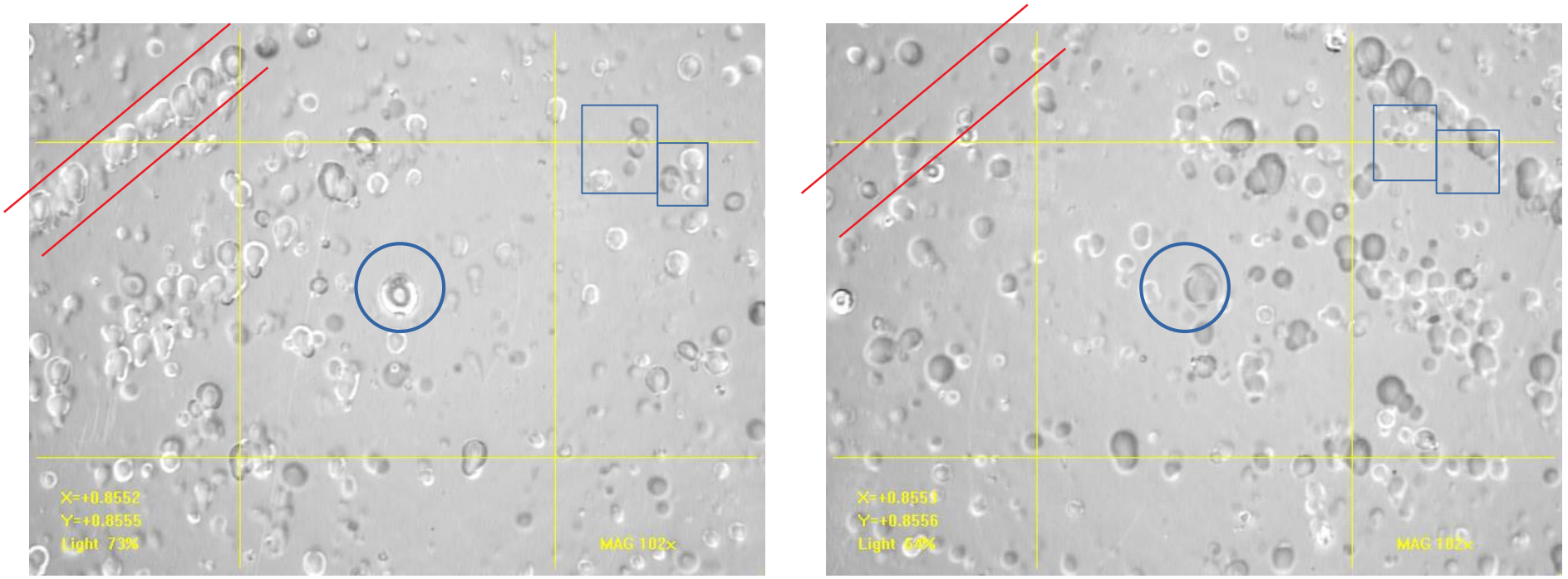
Top Left Corner



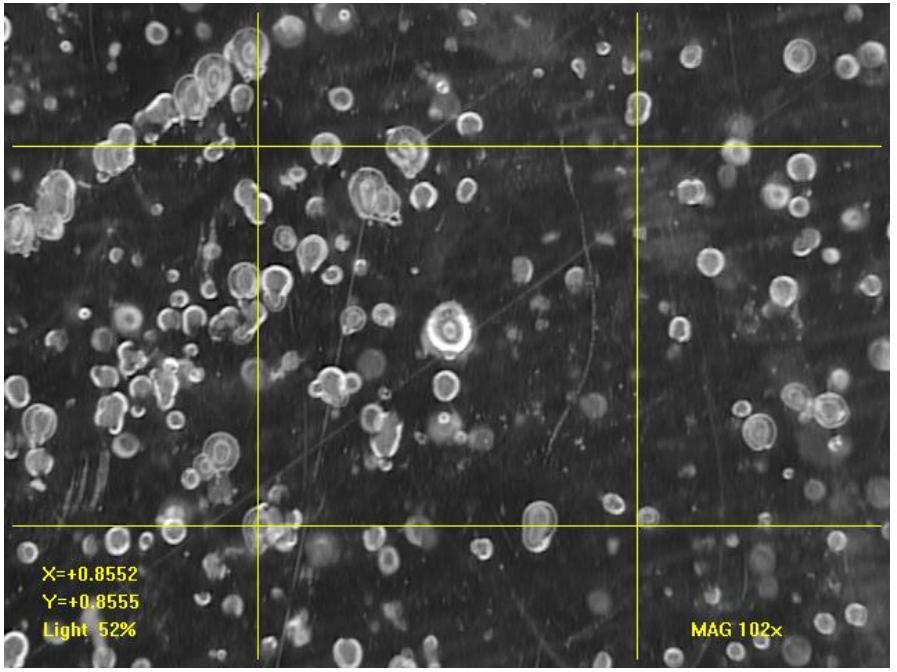


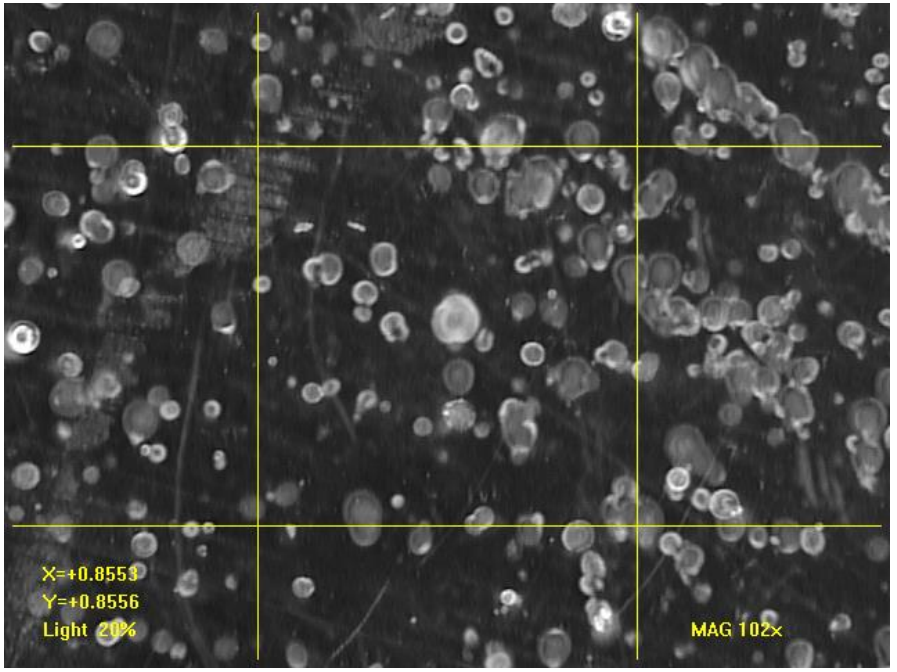
Top Left Corner - B+H

Line – probably a scratch or common event, thus expect holes to appear on the same side.
Side reversal flips bright / dark features, supporting hypothesis



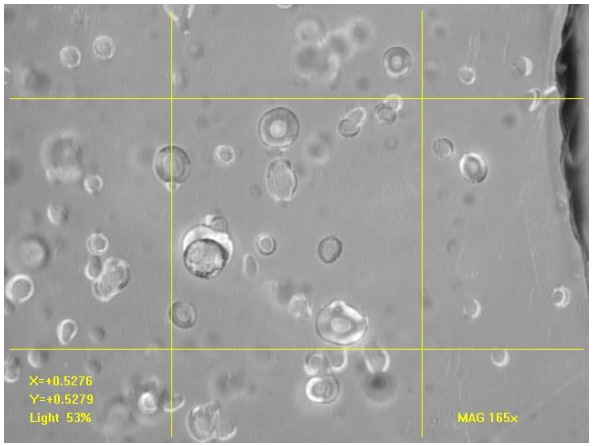
Top Left Corner

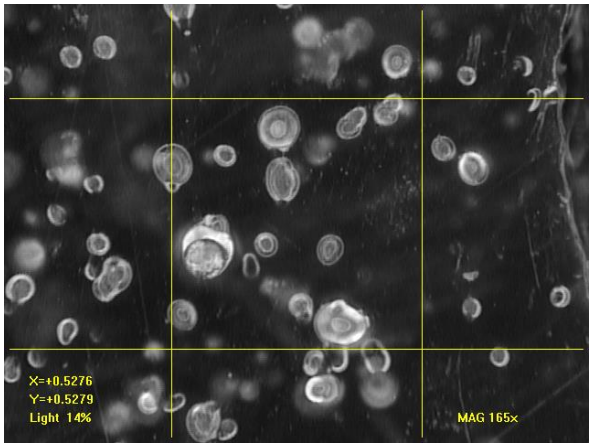


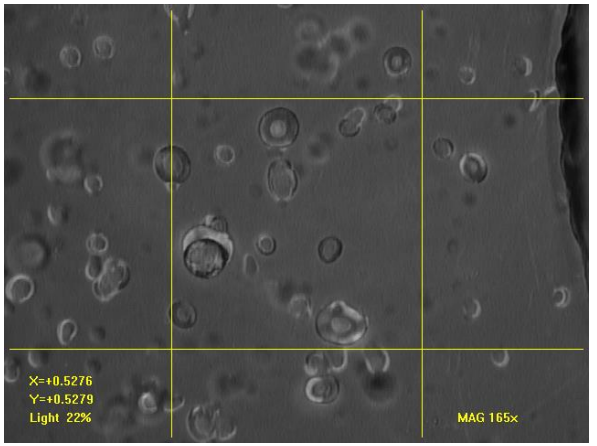


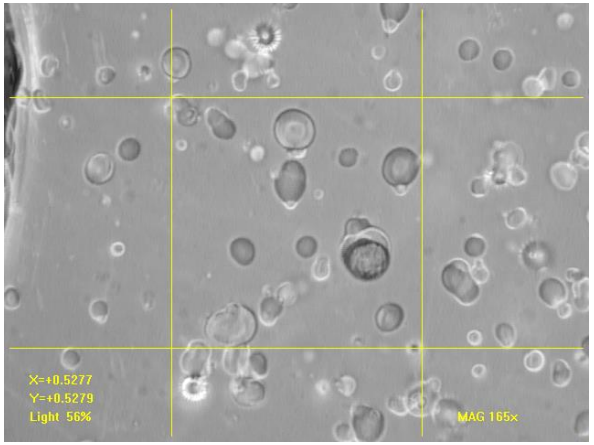
Triad region, 165x Zoom

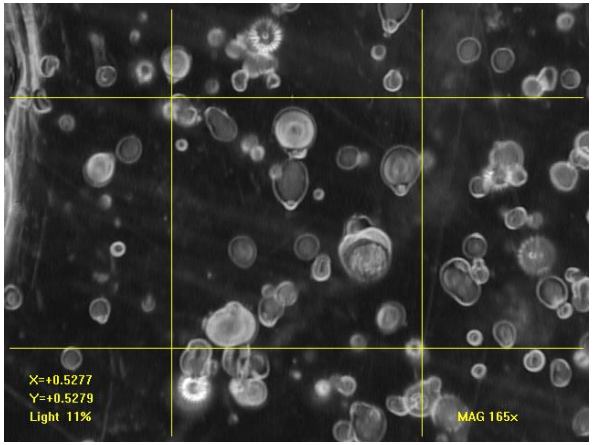
Bl = 8, Hl = 100

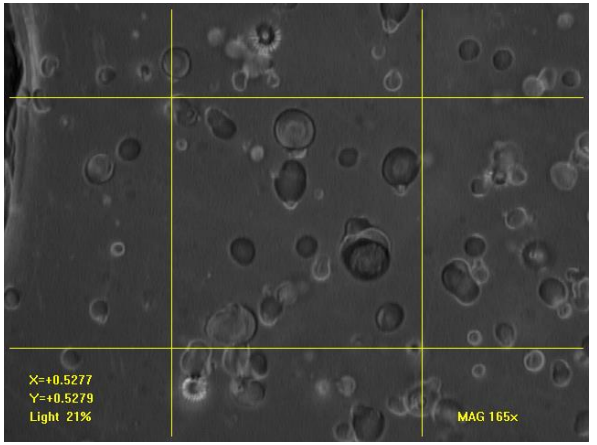






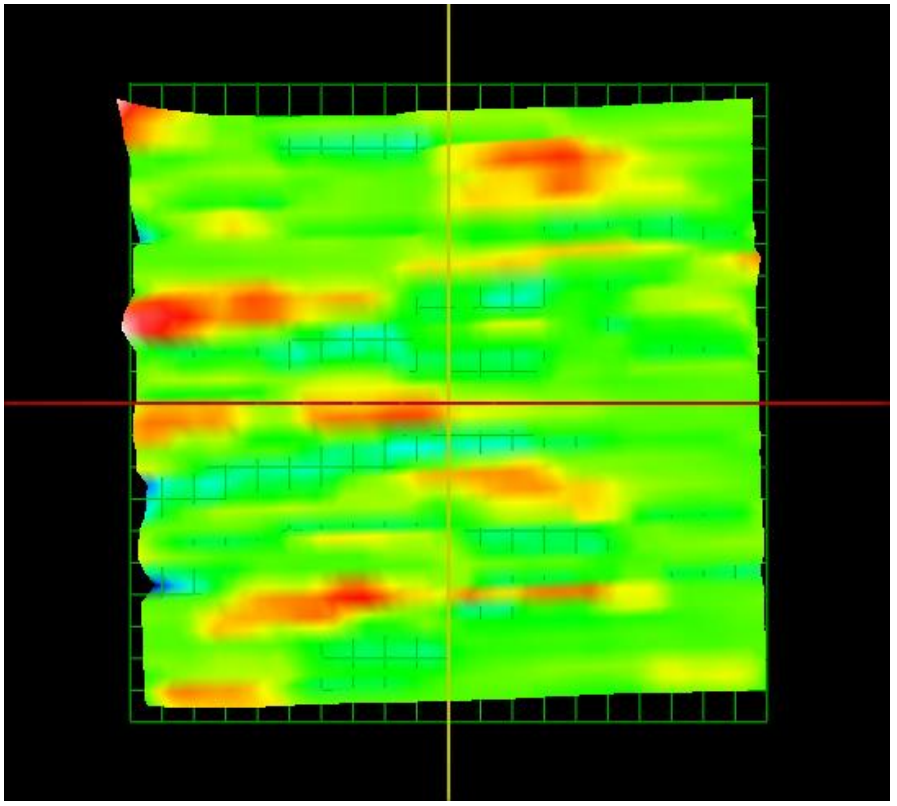


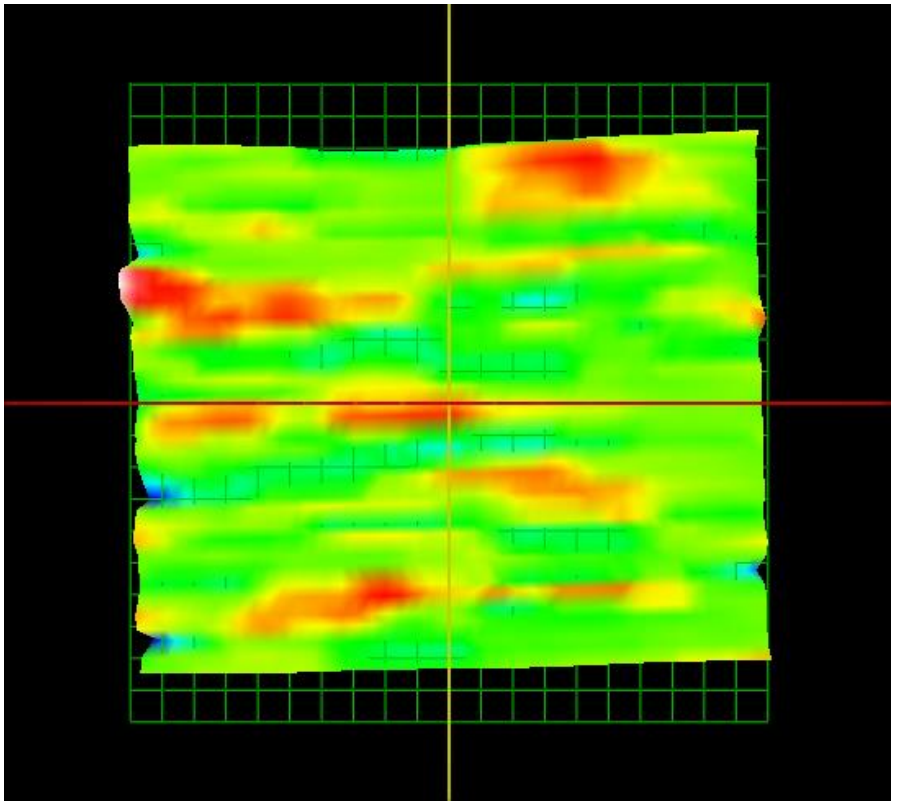




Laser resoloution

RHS, laser position resoloution x 10, not a major improvement
Tracking path (x,y) shows it does not travel completely smoothly





Next steps;

- More work on Automation / routines
- Fine-tune and understand laser more
- Look adifferent halo / backlighting mixes
- Collect some bulk data, try to train rudimentary pit-finder