



Moedal ML

Interleaved foils update

20th sept - 11th oct

Location 1

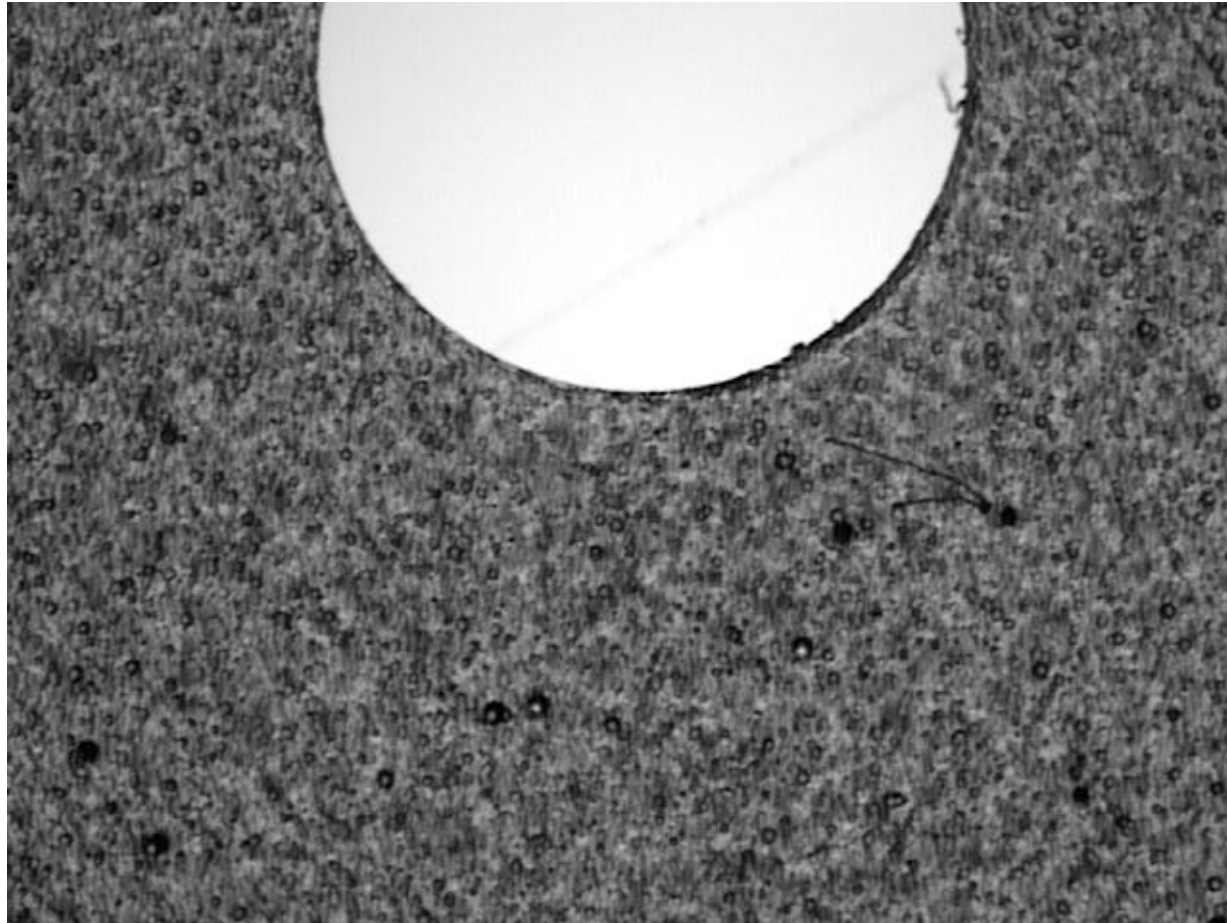
- Near alignment pinhole
- Clean = Pb ions only
Dirty = Pb ions + full(?*) LHC exposure
- ('66' backlighting for dirty foils)
('66' + rotational channel light for gifs)
('30' backlighting for clean images)
(just rotational illumination for clean gif)
- One 'clean' foil imaged
- 4 rotational channels used (90 degree light source rotation) vs 8 in prior analysis.

*Can check records, just not right now

1/4 - 'Dirty' makrofol

Hint of
through going
pits evident.

Visibility a bit
sensitive to
illumination
conditions



2/4 – rotational view

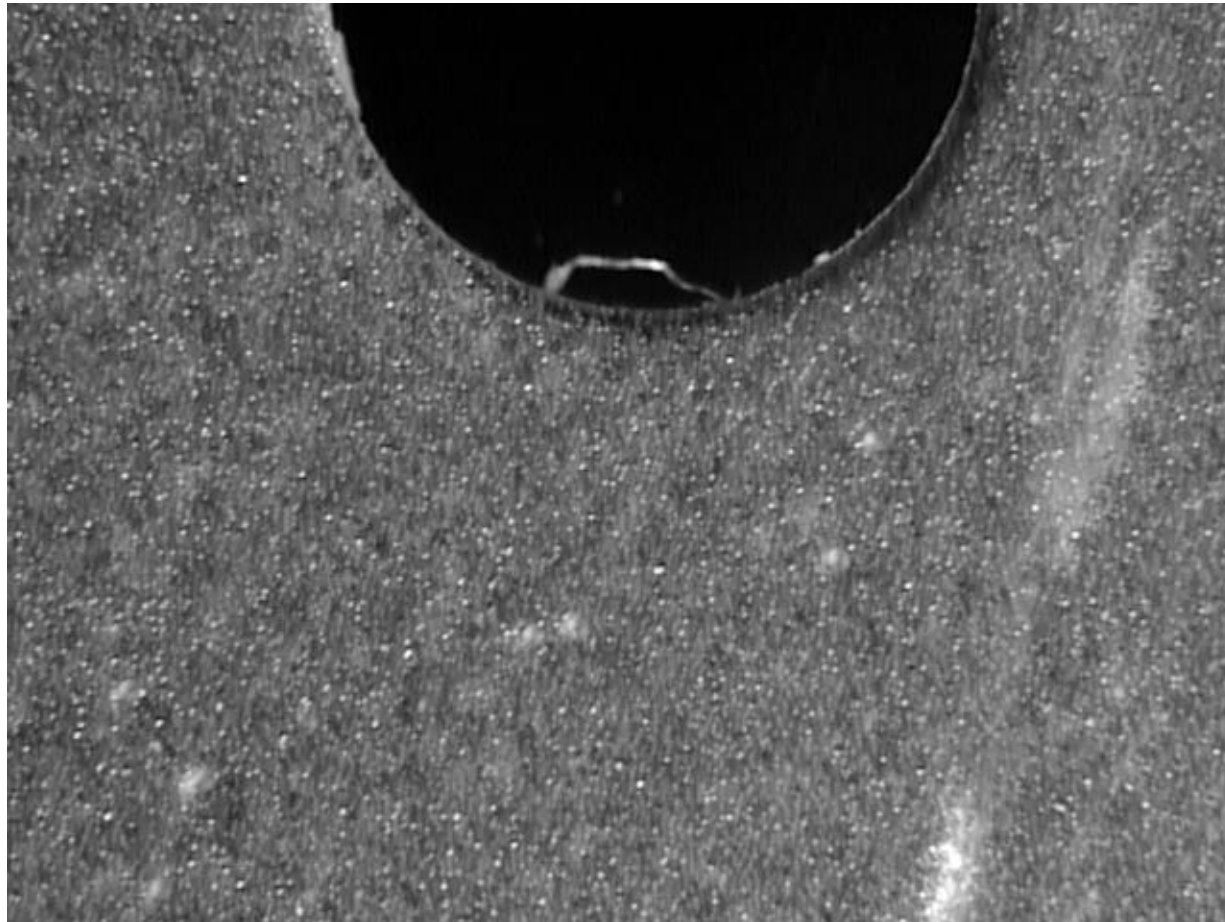
Unknowns

How well will this clean up in post processing with normalisation / thresholding / filtering

Does this pattern stand out or not to an ML based classifier. may/maynot be happy with an abstract motion pattern

Rotational pattern does stick out a bit but fainter

Many many more small edge illumination hits with full lhc exposure background (vs 8 month)

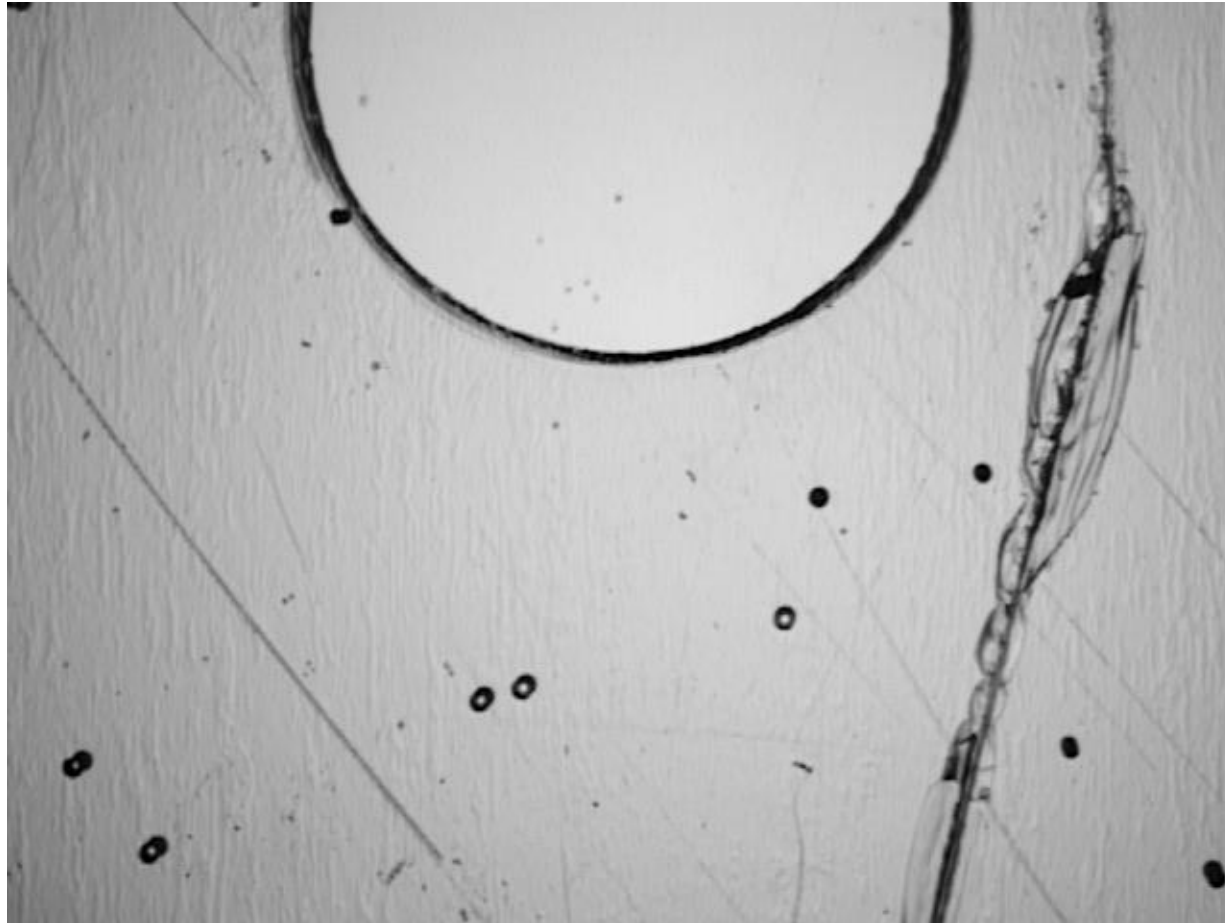


3/4 - 'Clean' makrofol

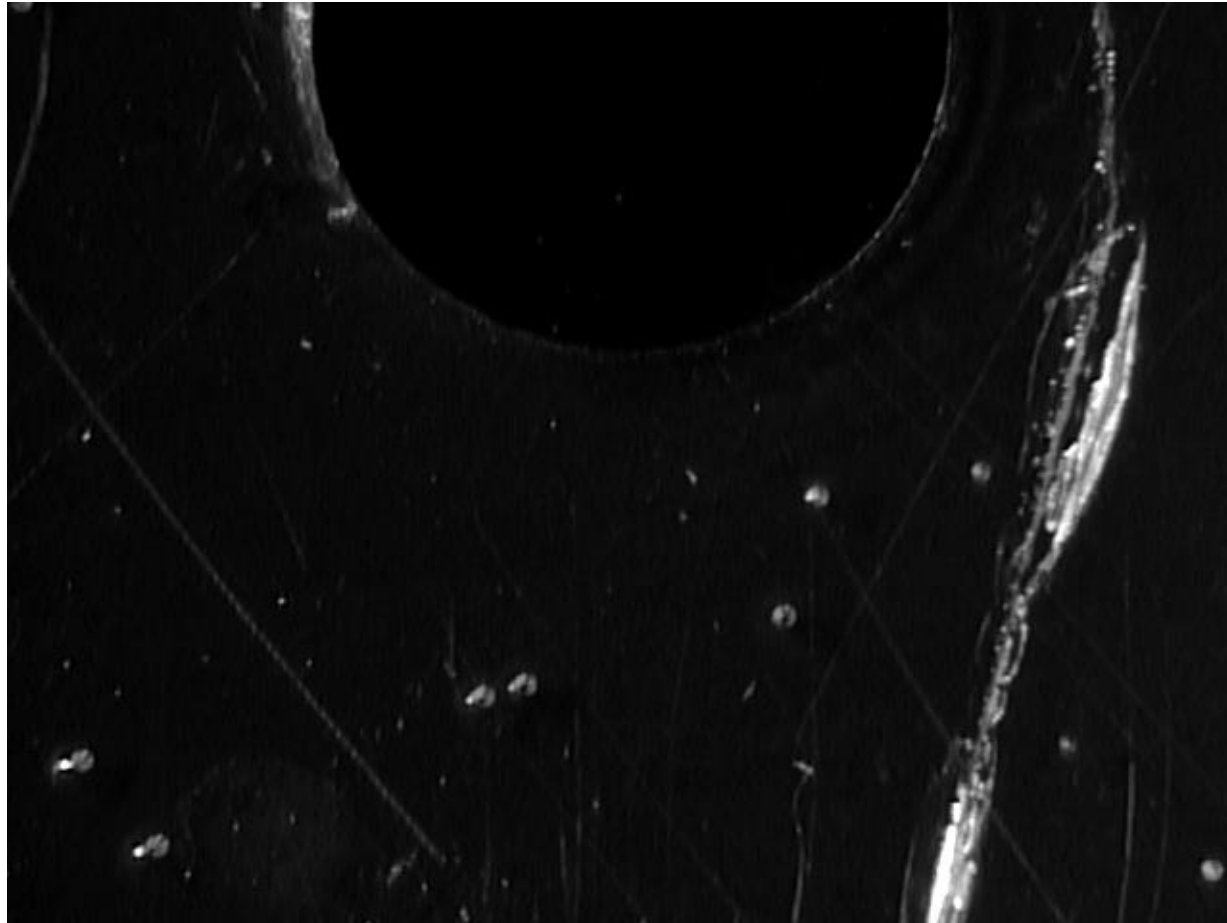
Trajectory of
through going
etch pits are
relatively close
foil to foil.

Tracking from
layer to layer
shouldn't be a
big issue

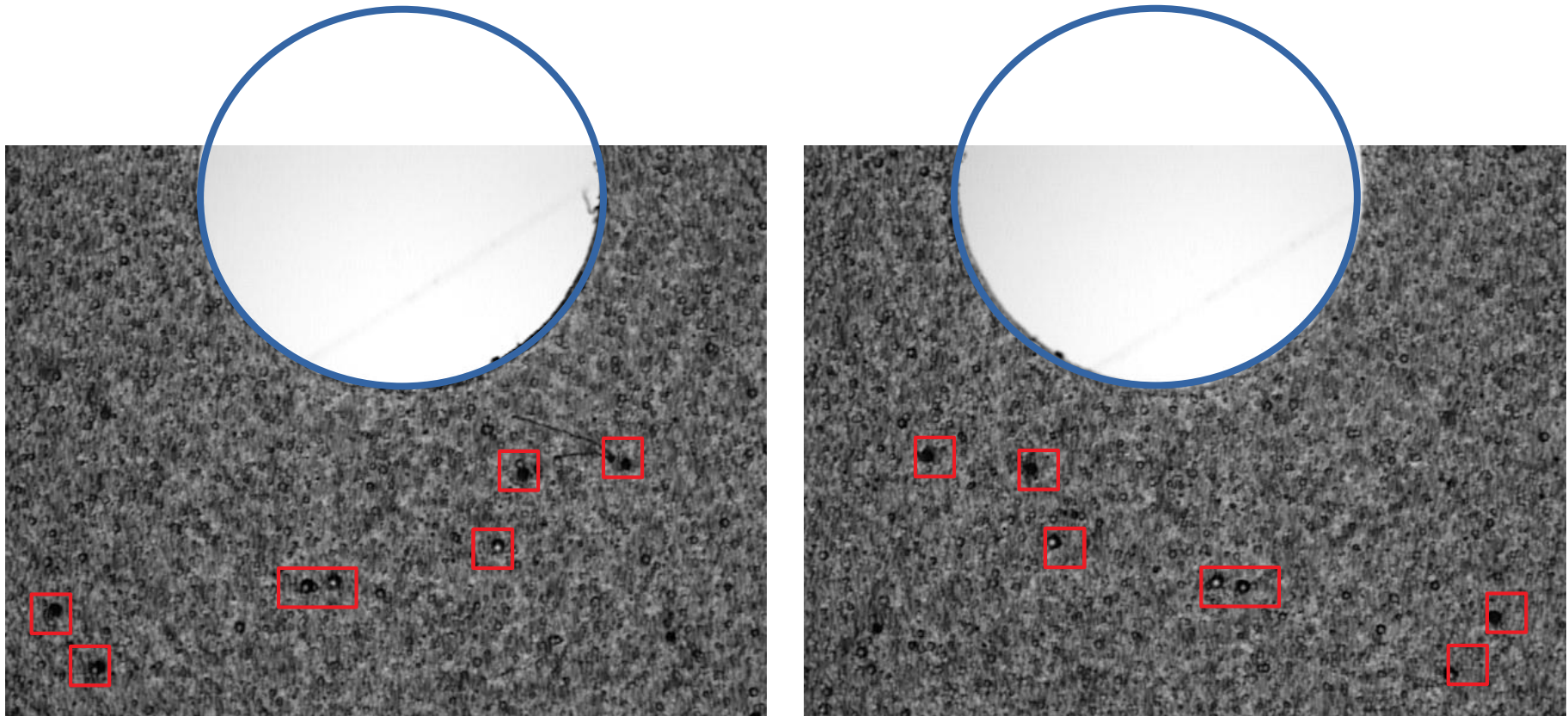
Location in
clean foil is
good enough
truth label for
location in dirty
foils



4/4 - 'clean' rotational

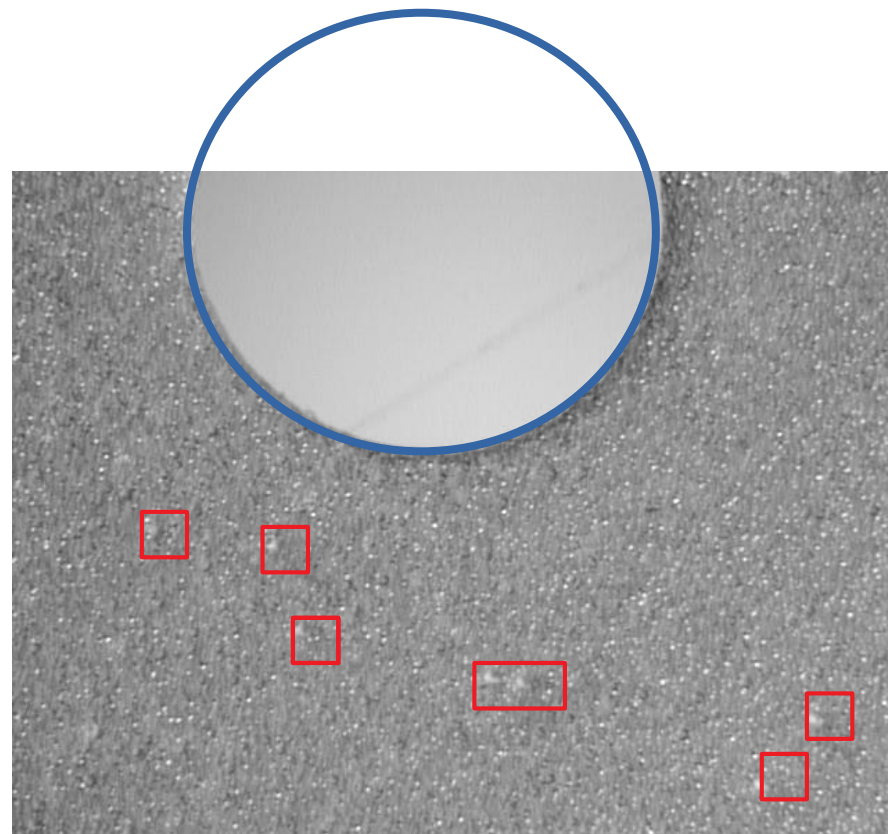
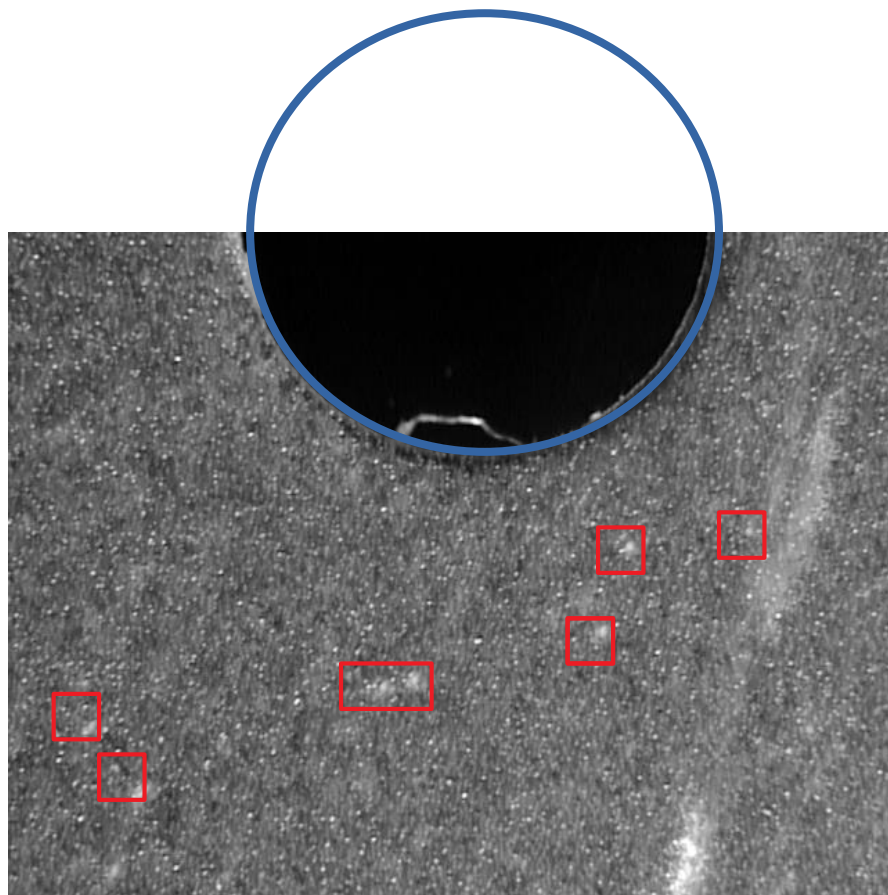


Front and back comparison

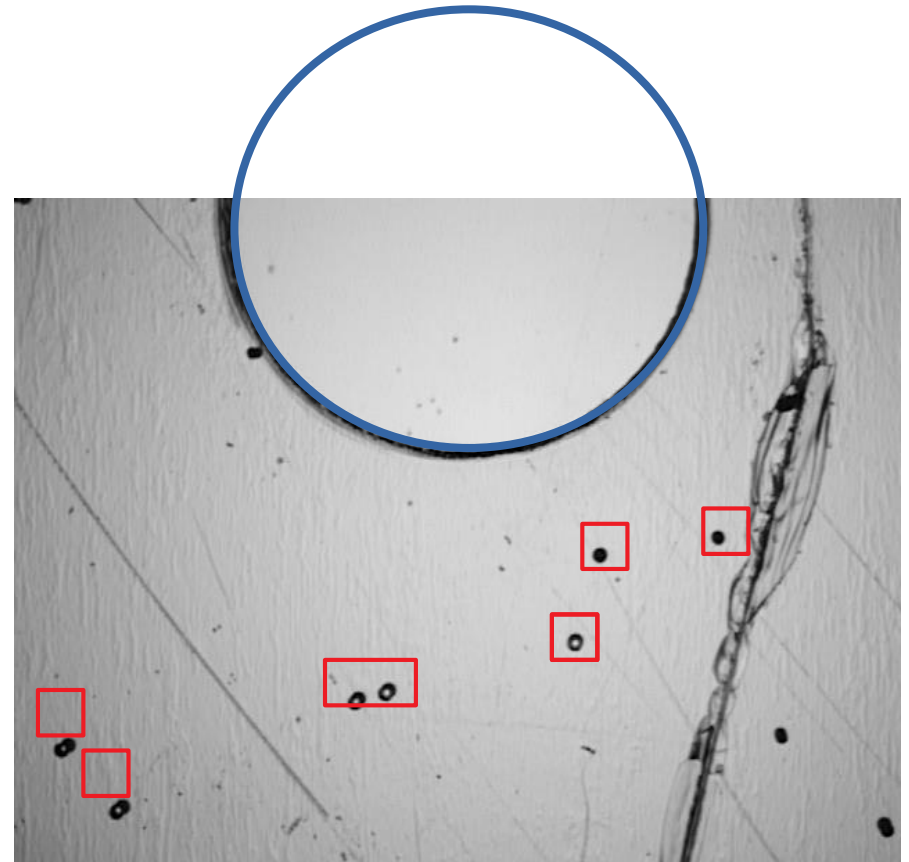
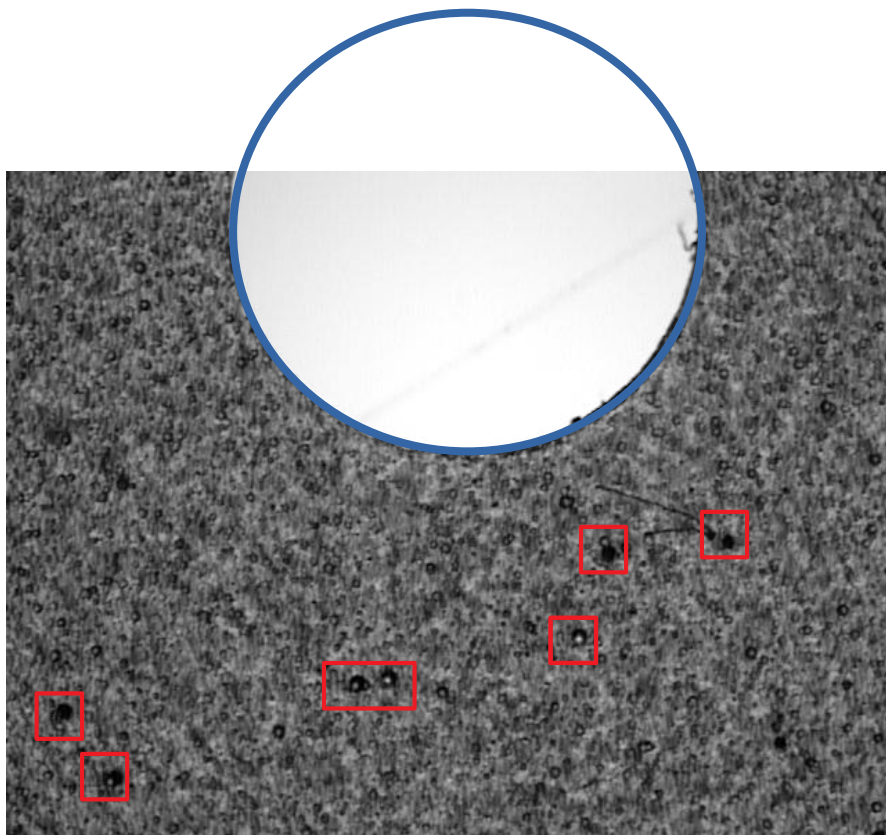


Using alignment hole as a datum shows we can expect to see a similar pit like structure in approx the same location on front and back surfaces (for through going etch pits) * could be viable to use a 'fuzzier' is/isnt pit classifier just looking at on surface at a time with simple illumination then look for coincidences

Front and back comparison



Tracking comparison





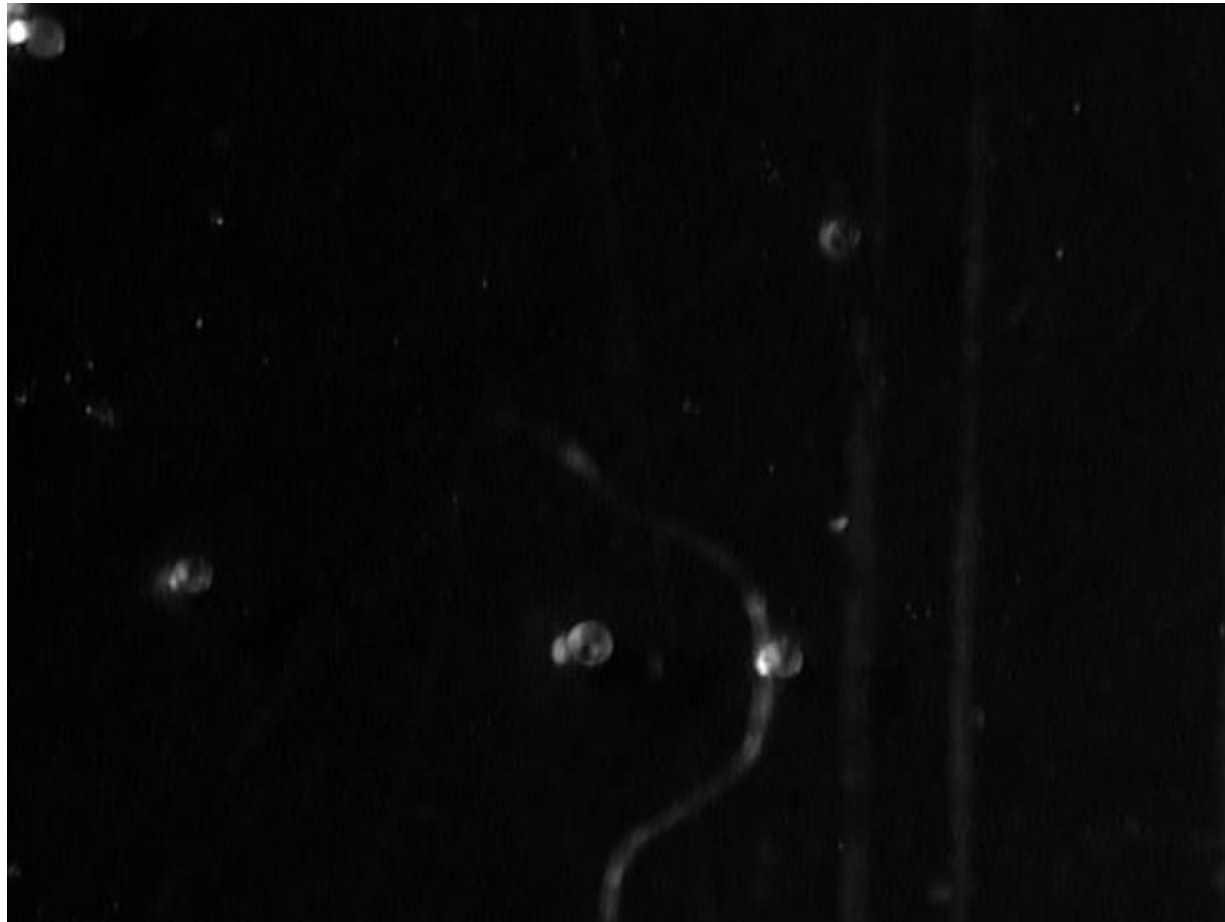
Other images

- Attempting to focus through to other surface / change focal plane didnt work well.

Close up – gif on clean foil

Not as distinct
as with the
thinner makrofol
and Xe

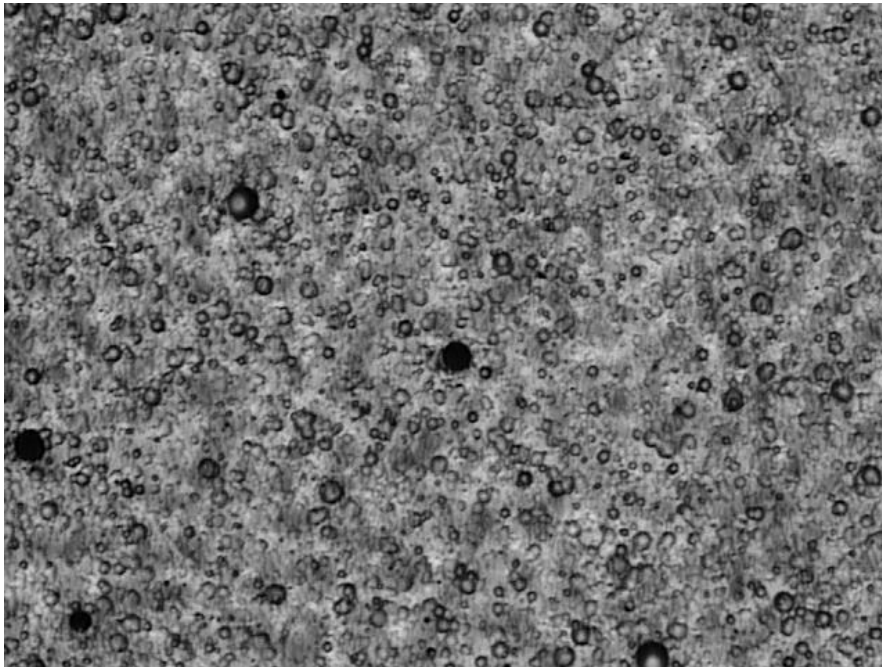
Pattern is still
not rotationally
symmetric for
through going
etch pits



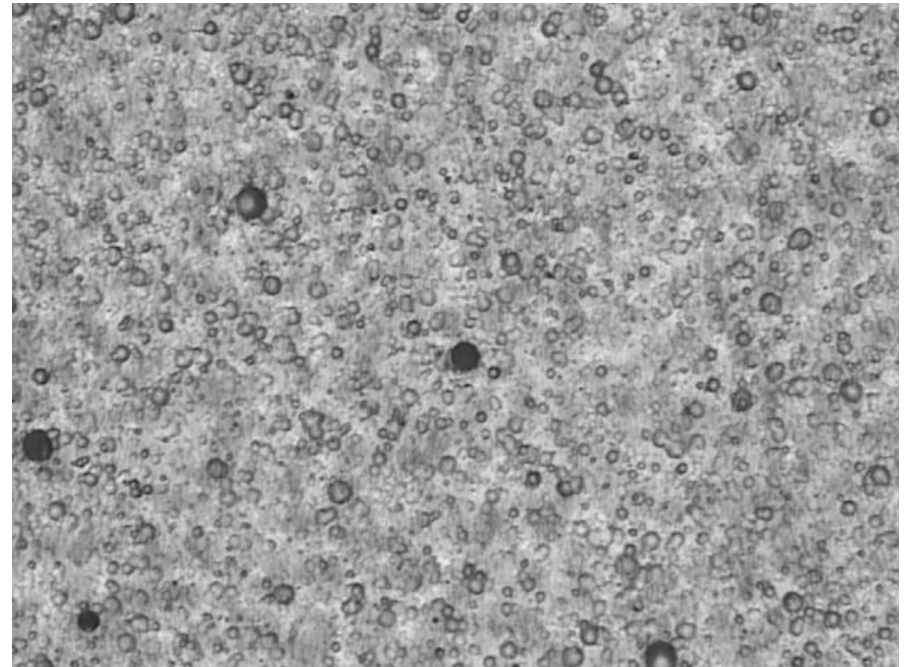
Location 2

* Note, wasnt possible to confirm alignment with clean foil here, mainly due to imaging manually and having no reference features and a higher zoom level.

Backlighting

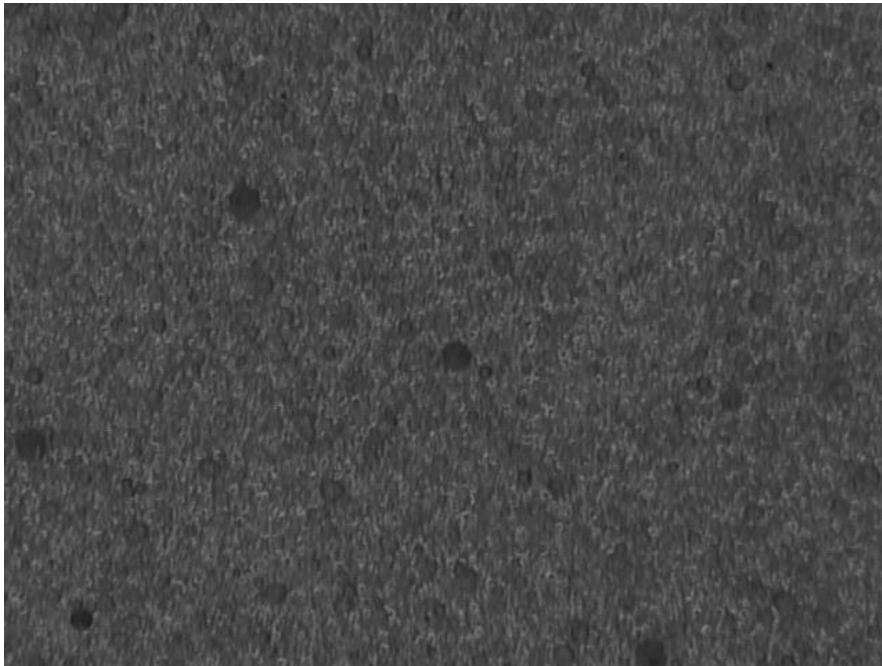


Backlighting + halo/edge lighting



Location 2

Halo / edge lighting



Rotational edge lighting



Bit hard to see in the gif but there is a semi consistent focal aberration producing a well defined circular edge around the large dark pits in the gif image. It can also be observed that the illumination peak for the large pits is rotating in anti-phase to most of the small surface peaks



Status

- Wasn't able to achieve primary goal, namely; Automated full surface scan of all 4 foils between scope being fixed and surgery.
- Should be quick to do when I'm back, but bit hard to say when that will be. Mainly / prob due to lab rules etc..