Developing a graphical interface for image analysis of z-stacks of DIC images.

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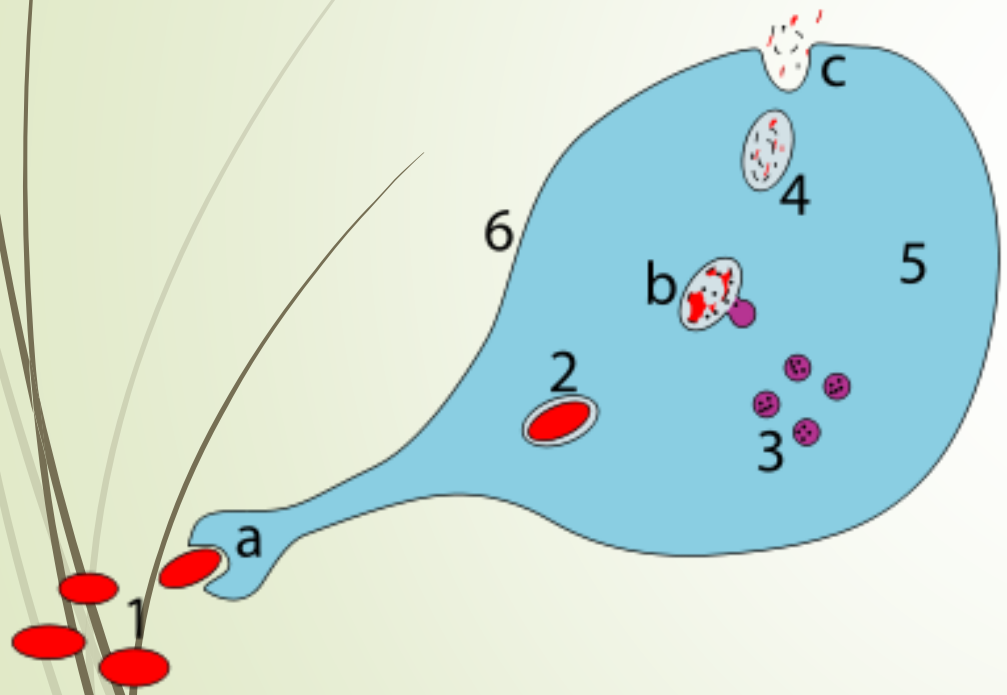
Outline:

- Background
- DIC microscopy
- Issue
- Project
- Expected Results

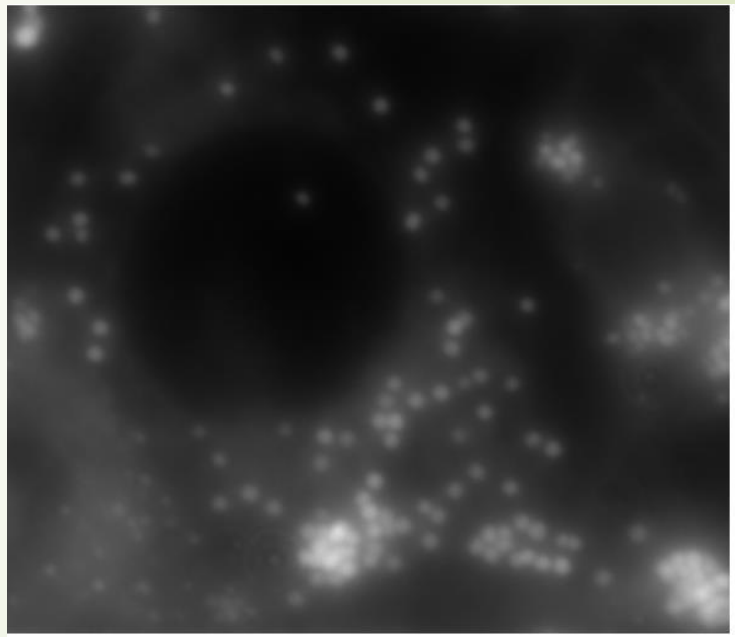
Background: Tuberculosis, Macrophage, Fluorescent dye.

Macrophage

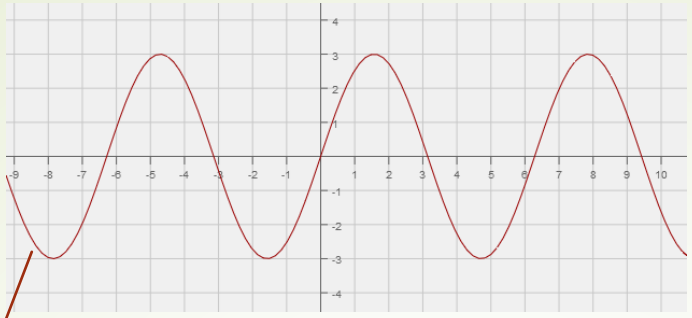


1. pathogen
3. Lysosomes

Result using fluorescent dye

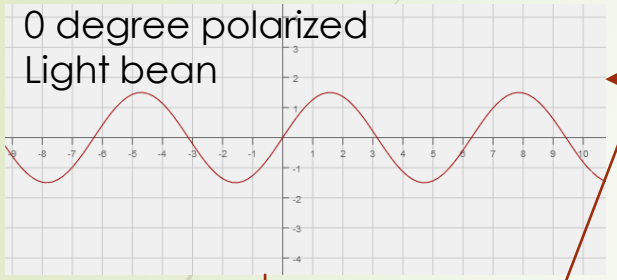


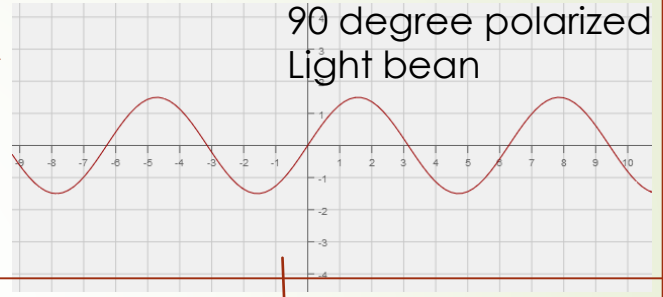
DIC: Differential interference contrast



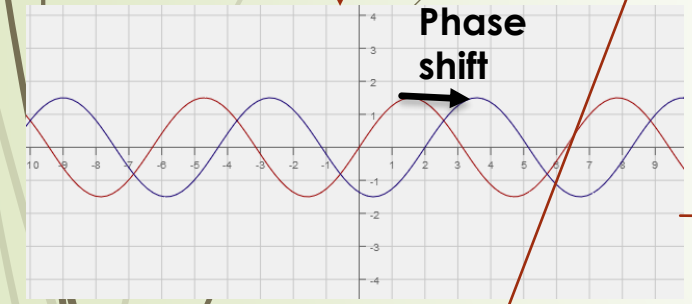
45 degree polarized Light bean

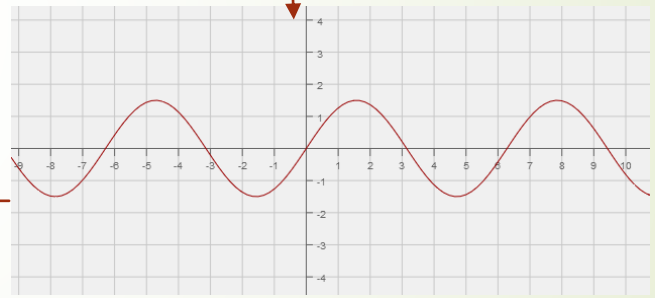
Original wave



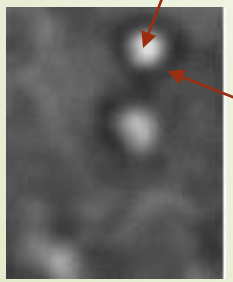


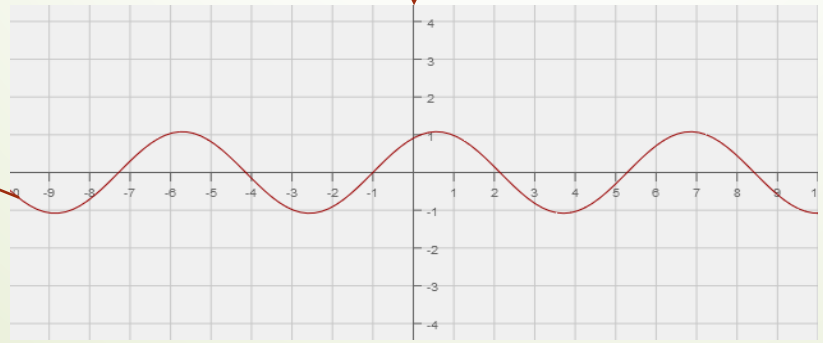
Wave is decomposed in 2 components





Light goes through the cell, phase shift happens





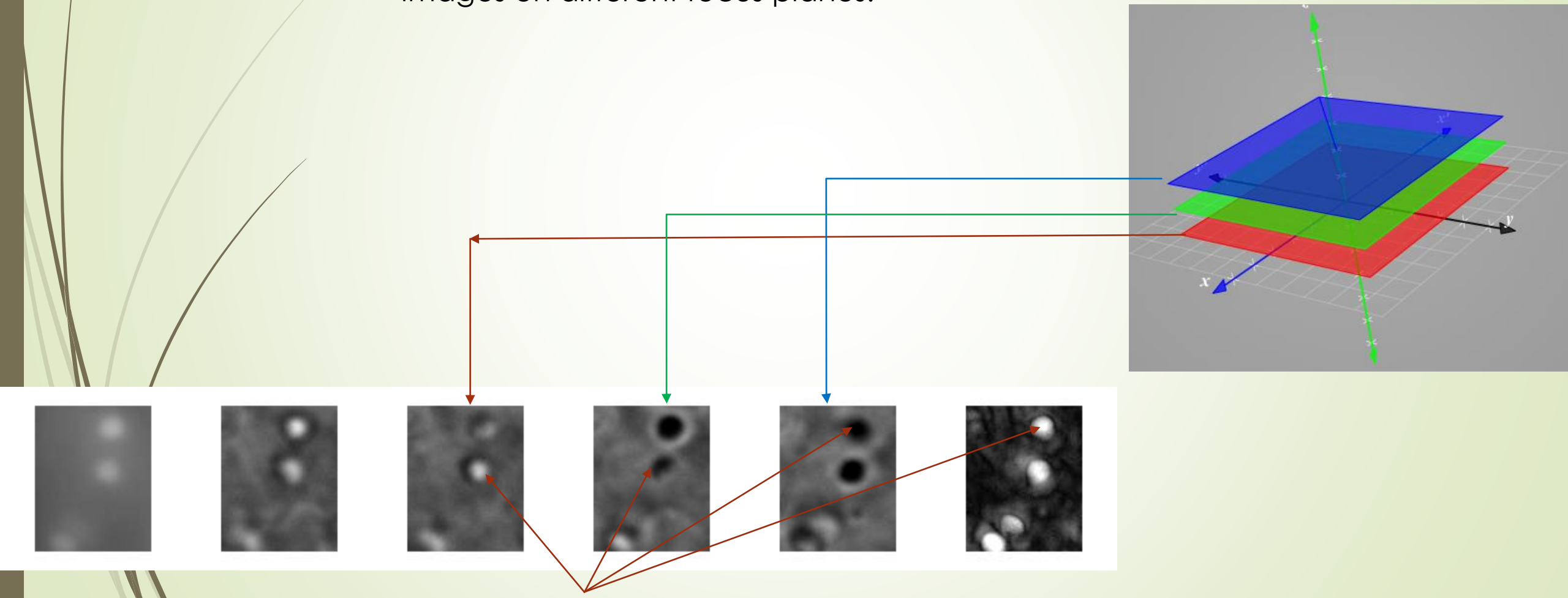
45 degree polarized Light bean

Light is recomposed

DIC: Differential interference contrast

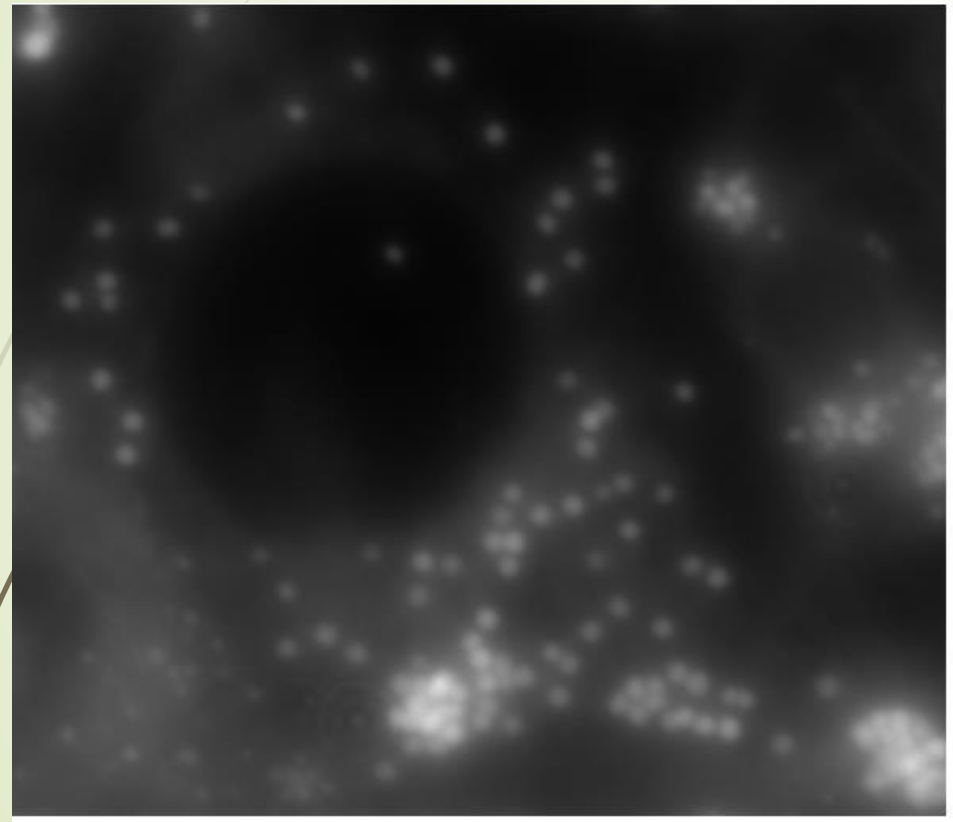
This process is repeated multiple times at different focus planes (at different height) to create a z-stack.

Images on different focus planes.

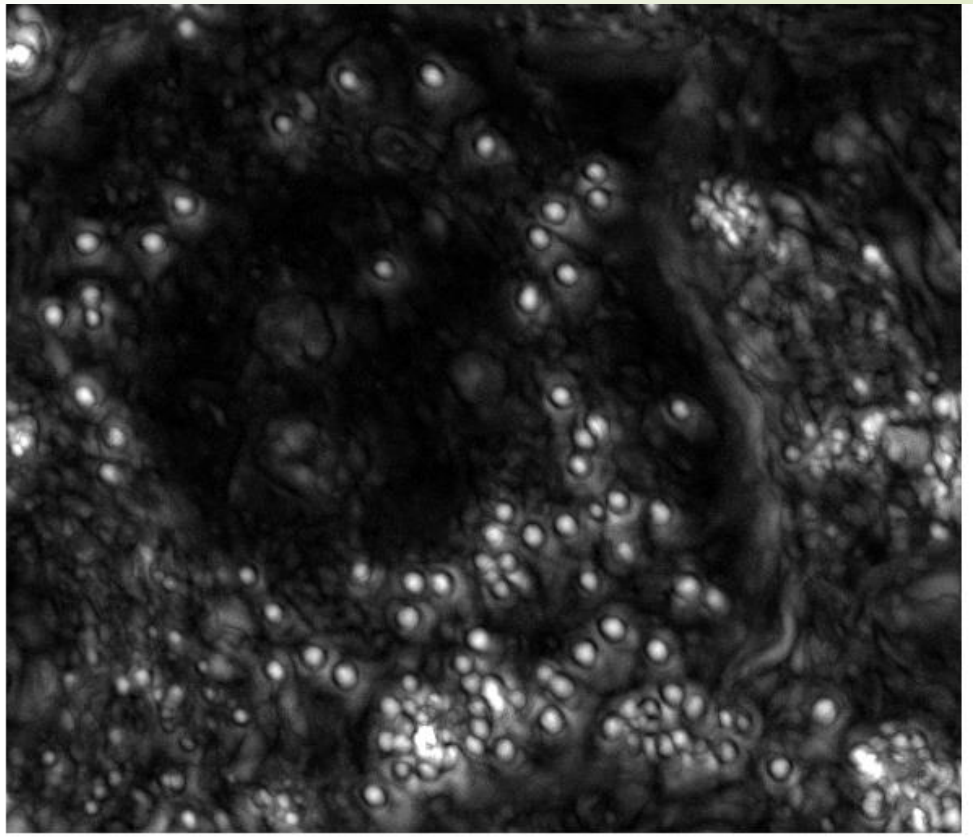


DIC: Differential interference contrast

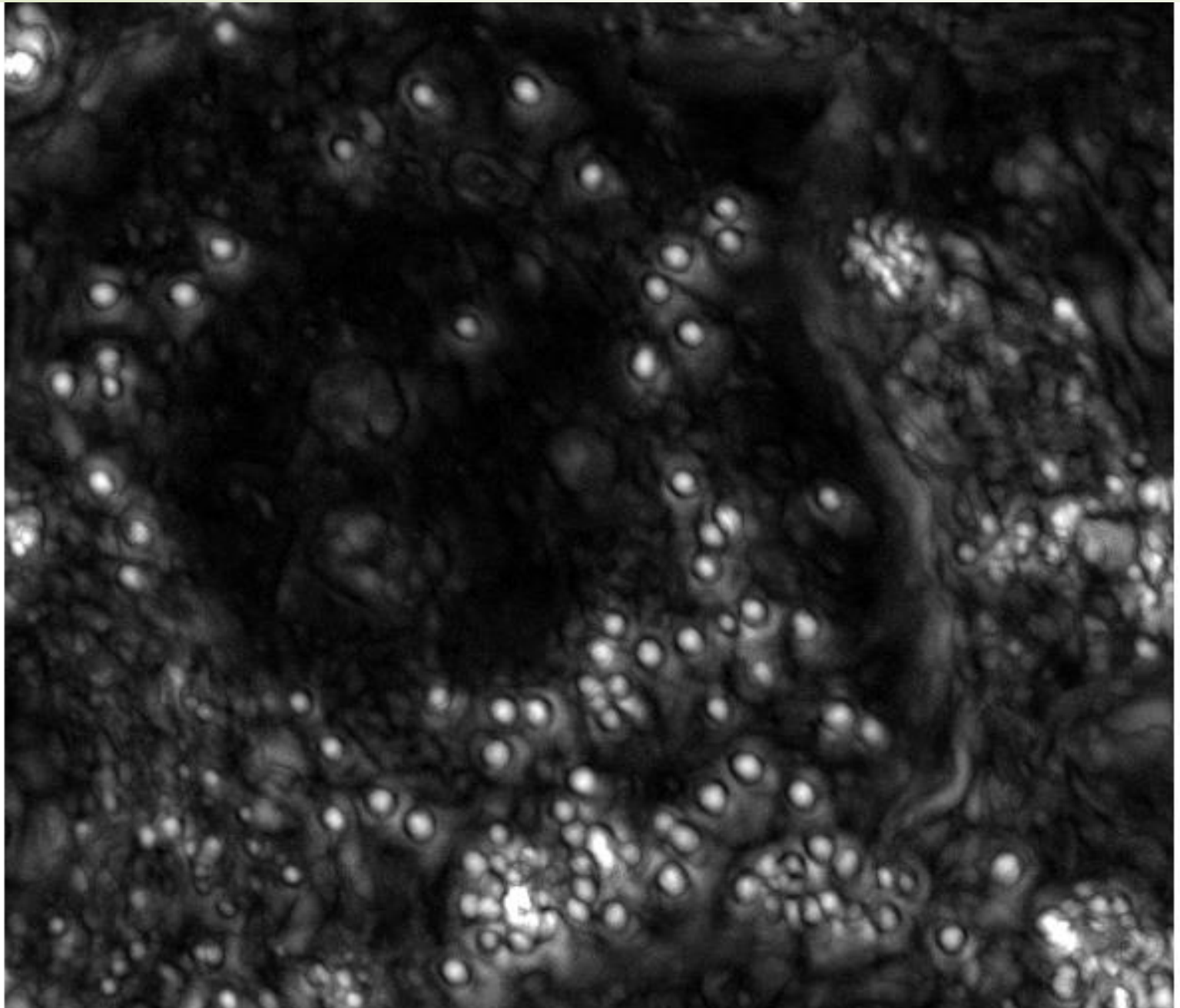
Result using fluorescent staining



Result obtained with DIC technique



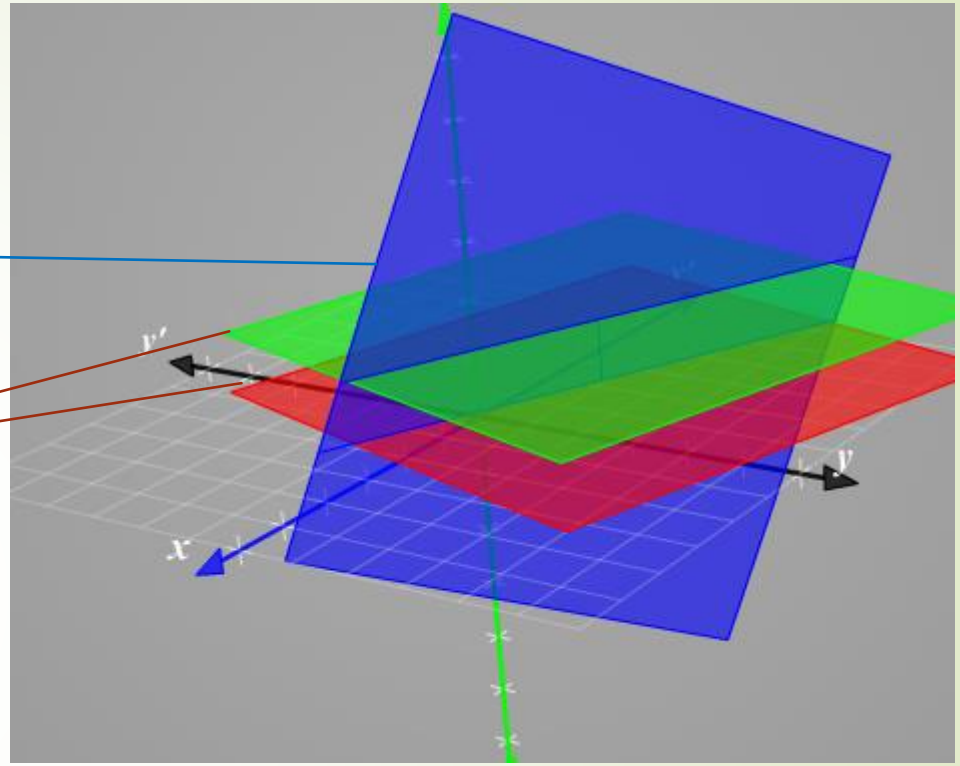
DIC: Differential interference contrast



The issue

Z stack

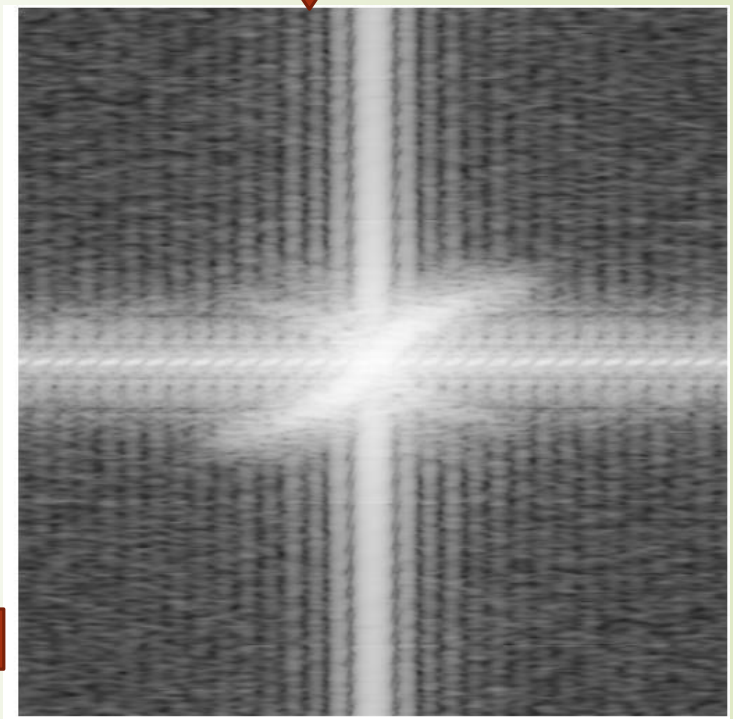
Focal planes



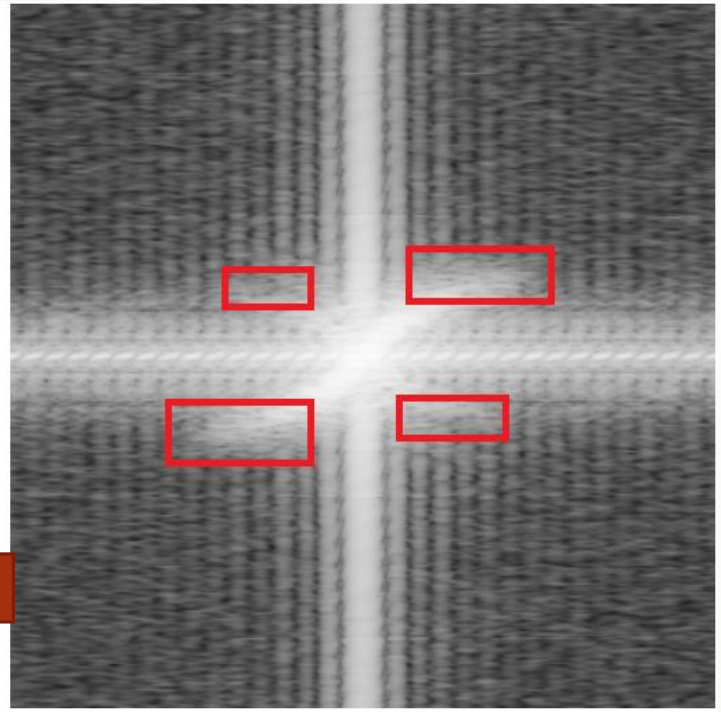
Project

Z-stack

Fourier transform

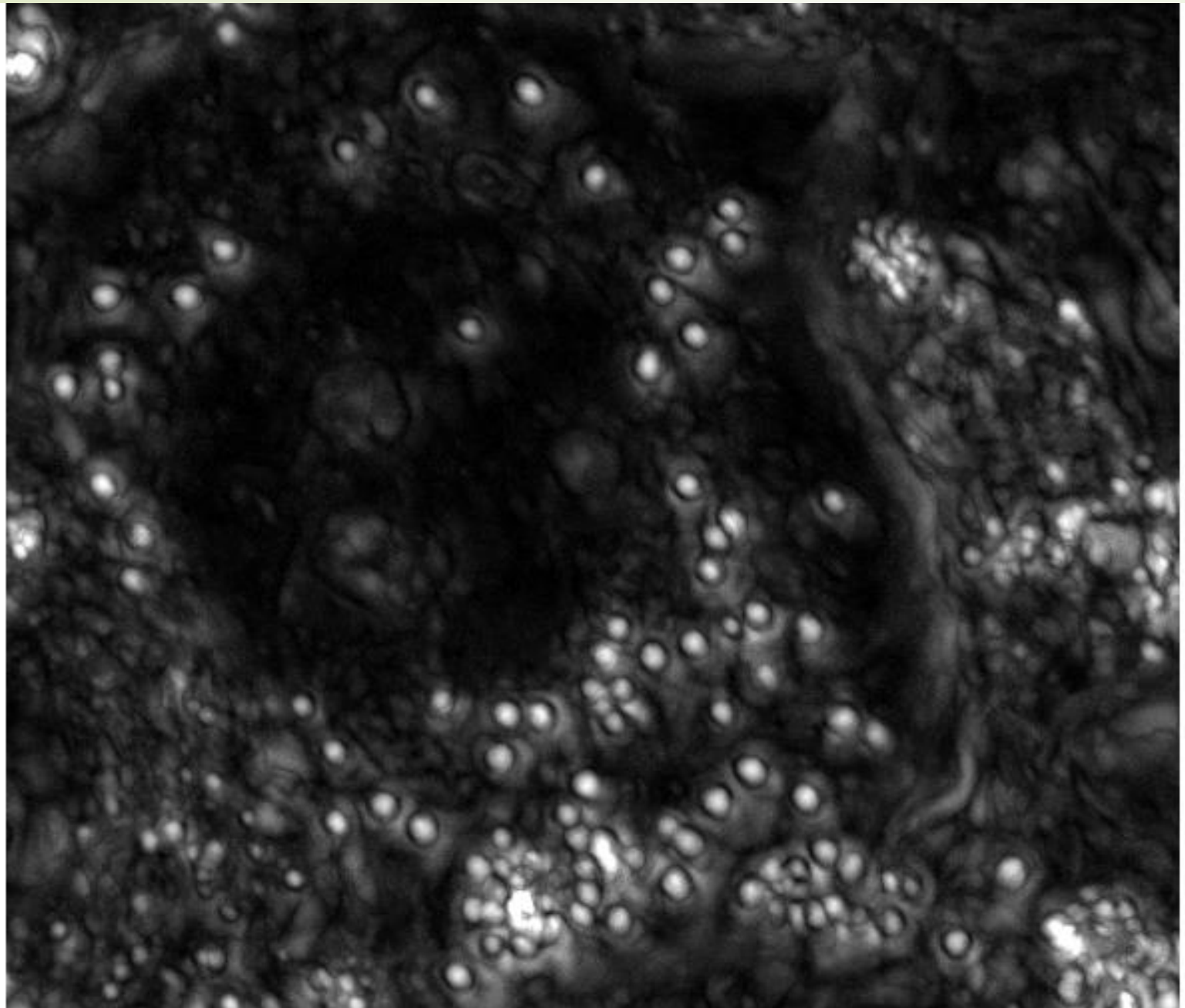


Suppress non-orthogonal component



Inverse Fourier Transform

Expected result



Expected Results: halos disappear.

- -Allows for better measurement of lipid bodies.
- -Automated image analysis possible