

# Instructions for using Interferometric mode on Microvision

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## Part 1: Taking data

Install Mireau objective .

Save an experiment under the name (for example) "exp1".

Take images as you would normally with microvision, but do the following differently:

With the Mireau objective, you will need brighter light. You can turn up the positive voltage to the LED (usually around 4.2 or 4.3 volts), but don't go above 4.9 volts!

When setting the focal planes, we want to scan in the z direction half a wavelength (the wavelength of the LED is about 530 nm). Do this by taking the vlaue you focused on, and adding and subtracting 0.133. Then set the number of steps to 7 (I'm still trying to find the optimum number here).

After you take the images, you can quit the Microvision software.

## Part 2: processing the images.

Copy my folder /home/jneumann/analysis to your space.

Go into the folder and copy the images into it like so:

```
cd analysis
remove      (this removes old phase driectories and zMag and zAng files)
cp -R ../exp1/freq*100/phase* .
      (substitute whatever frequency you measured for 100. Don't forget the period at
the end, which indicates to copy into the current directory).
```

Now you select an area of interest out of one of your images. You can view the whole z-scan for one phase by doing something like this:

```
vnd phase=1/*
```

Pressing "n" will step you through the z-scan, or "b" will run it continuously.

Use the mouse to obtain coordinates for the region of interest.

Edit the file "anzl" and put your coordinates (X1,Y1), (X2,Y2) into the following line like so:

```
foreach f(1000)
/home/jneumann/src/xypt 4D/f=$f.4D X1,Y1-X2,Y2 0 5-12
mag/mag.$f.1 2 ang/ang.$f.
1 200 > z1.$f
```

Type "ana" and the analysis will be run for the images you copied over. By the way, everything is set up right now as if the frequency is always 1000 Hz. It doesn't affect the analysis.

You will see output like:

```
cm-1 jneumann/janalyze> ana
best points per period = 6.680256
k = 0.940561 + -0.005133 * (i-xcenter) + -0.002926 * (j-
ycenter)
1000 1.51606
1000 152.591
cm-1 jneumann/janalyze>
```

The "best points per period" is an estimate of how many focal planes you used (I used 7 in this example). I don't know what the k thing is. Below that you see the frequency followed by the magnitude of the vibration (in nm) on one line, and the frequency followed by the phase angle on the next. This example was done with just a stationary object, so it gives an estimate of the noise you can expect (1 or 2 nm). I hope to improve this.