

# Measurement of the Tama-size sapphire sample

Inside

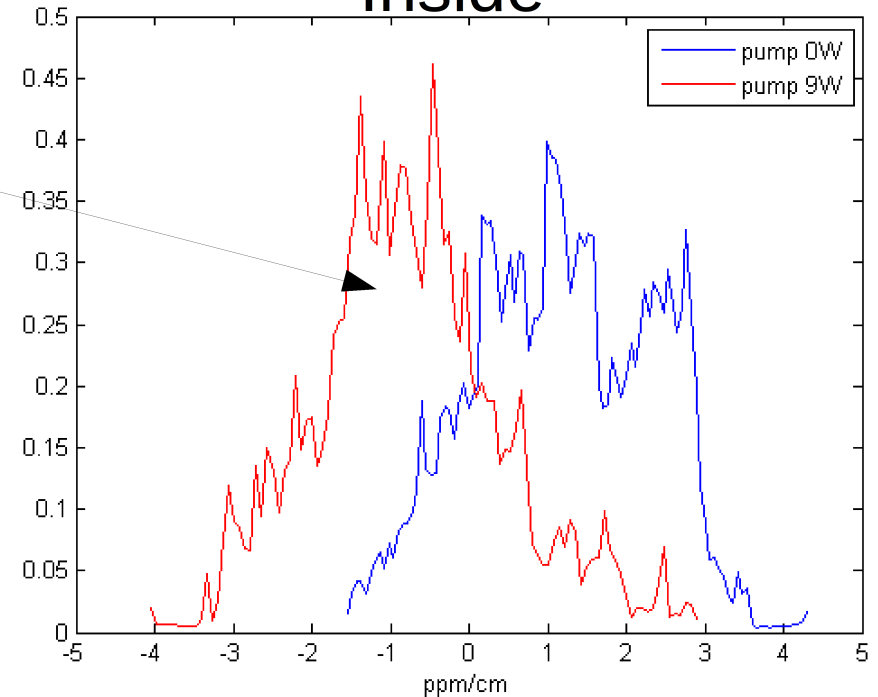
Why is the absorption signal negative?

Because of the expected phase filtering:

$$AC' = AC \cos(\phi - \phi_{\text{expected}})$$

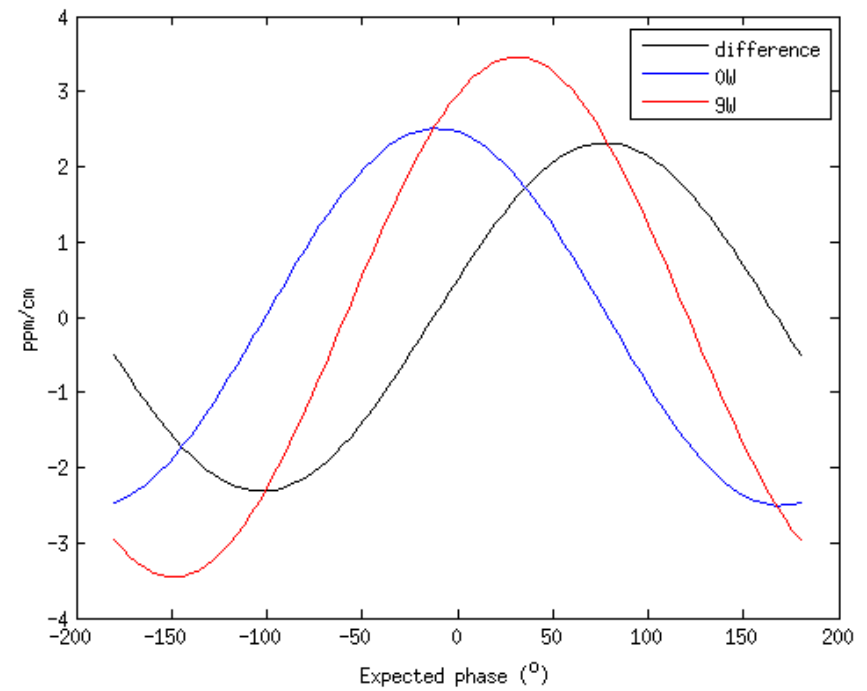
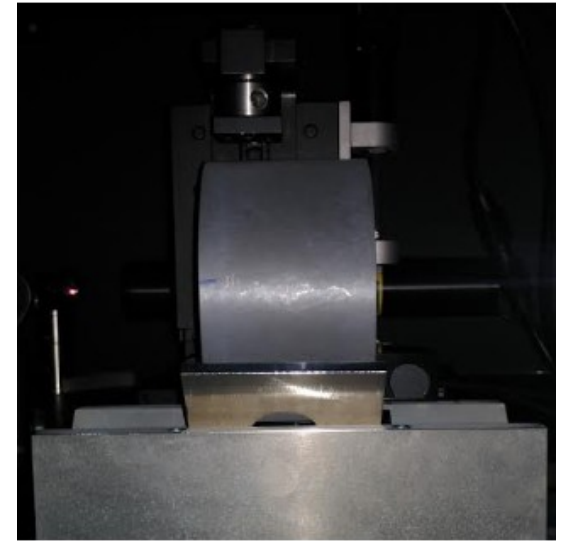
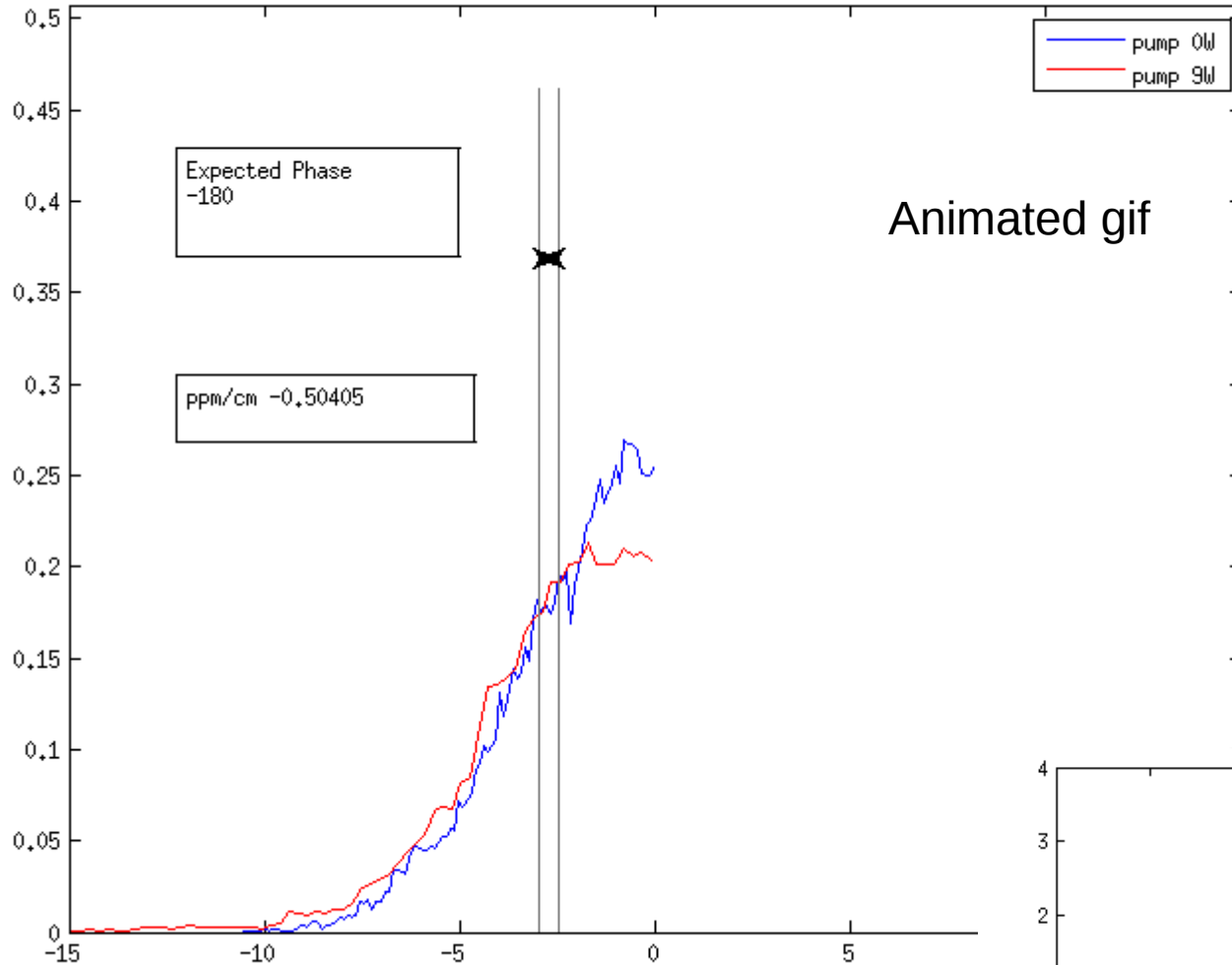
Assuming that the expected phase depended only on the material, I used the phase I found with the small sapphire sample:  $-105^\circ$

But maybe it depends also on other parameters.

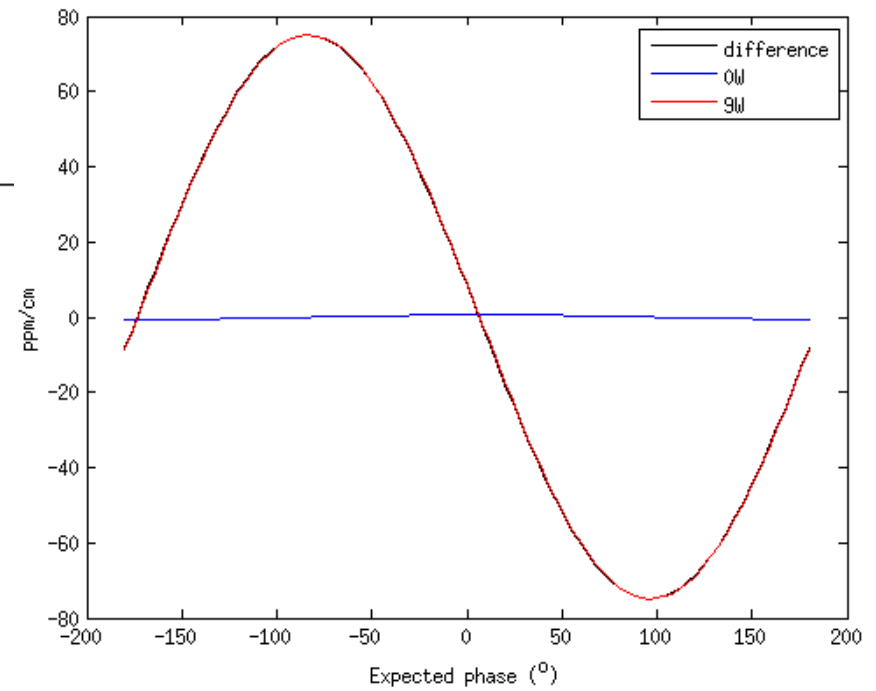
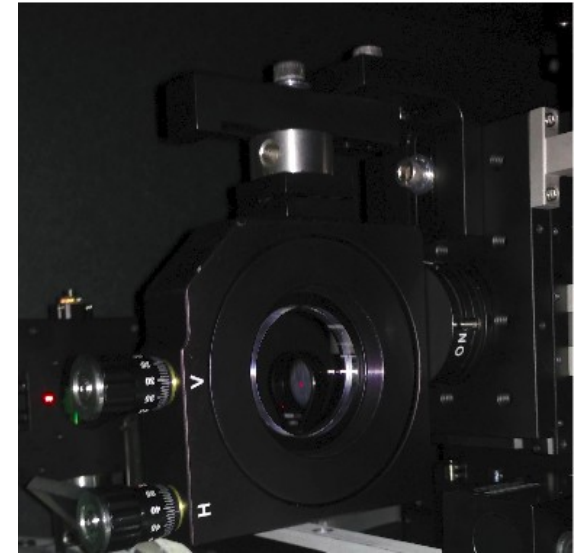
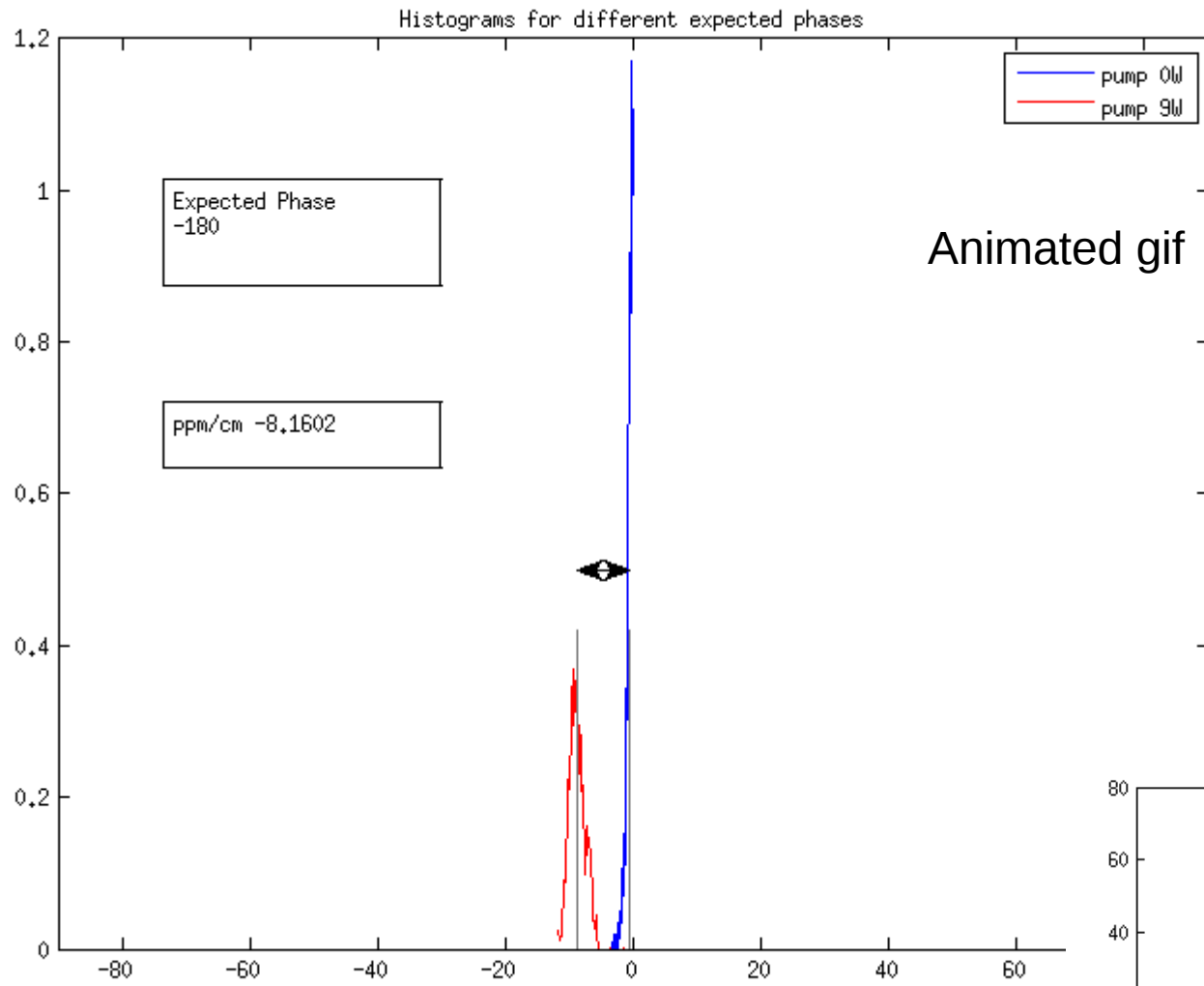


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Histograms for different expected phases

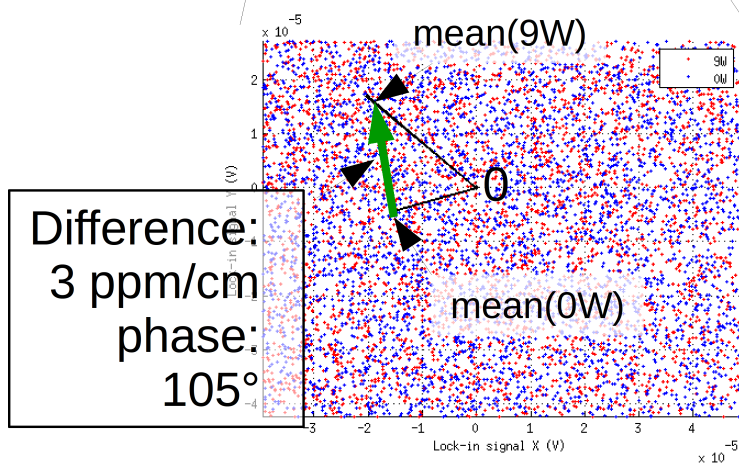
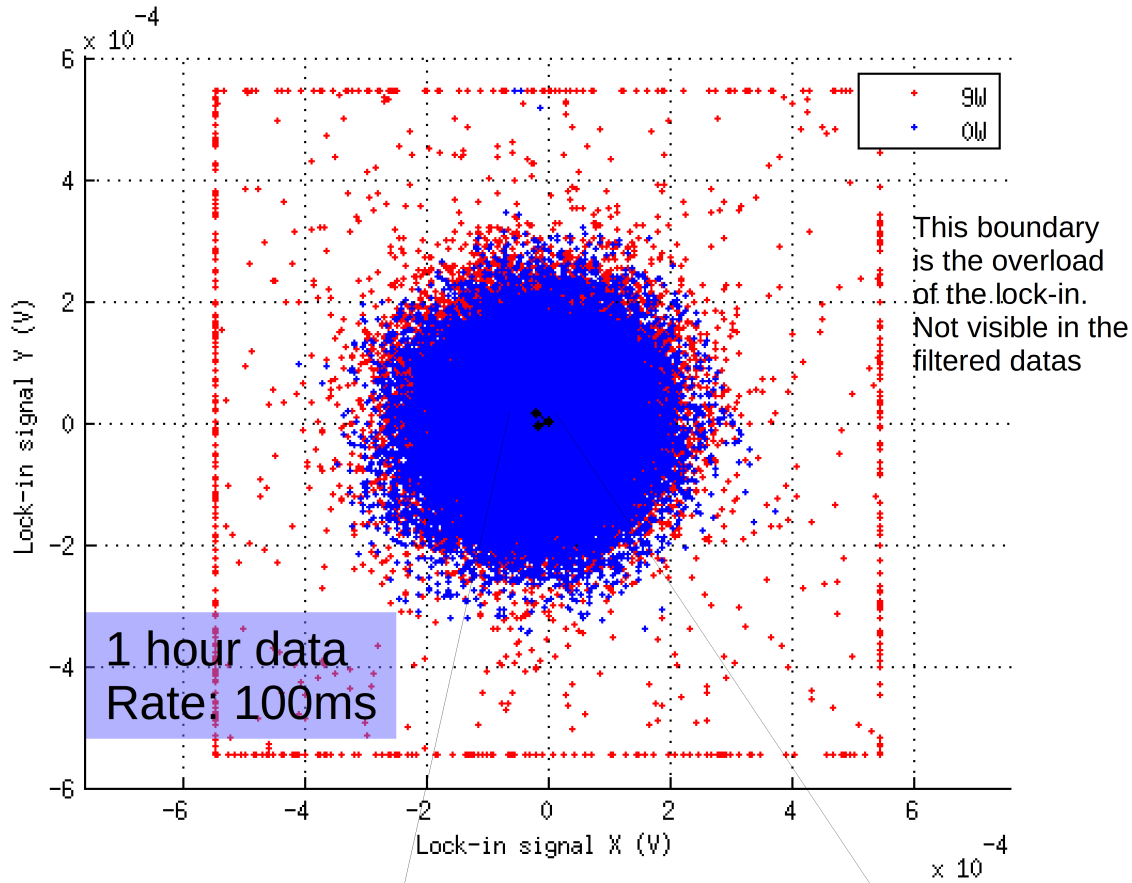


# Measurement of the small (1.5" diam) sapphire sample

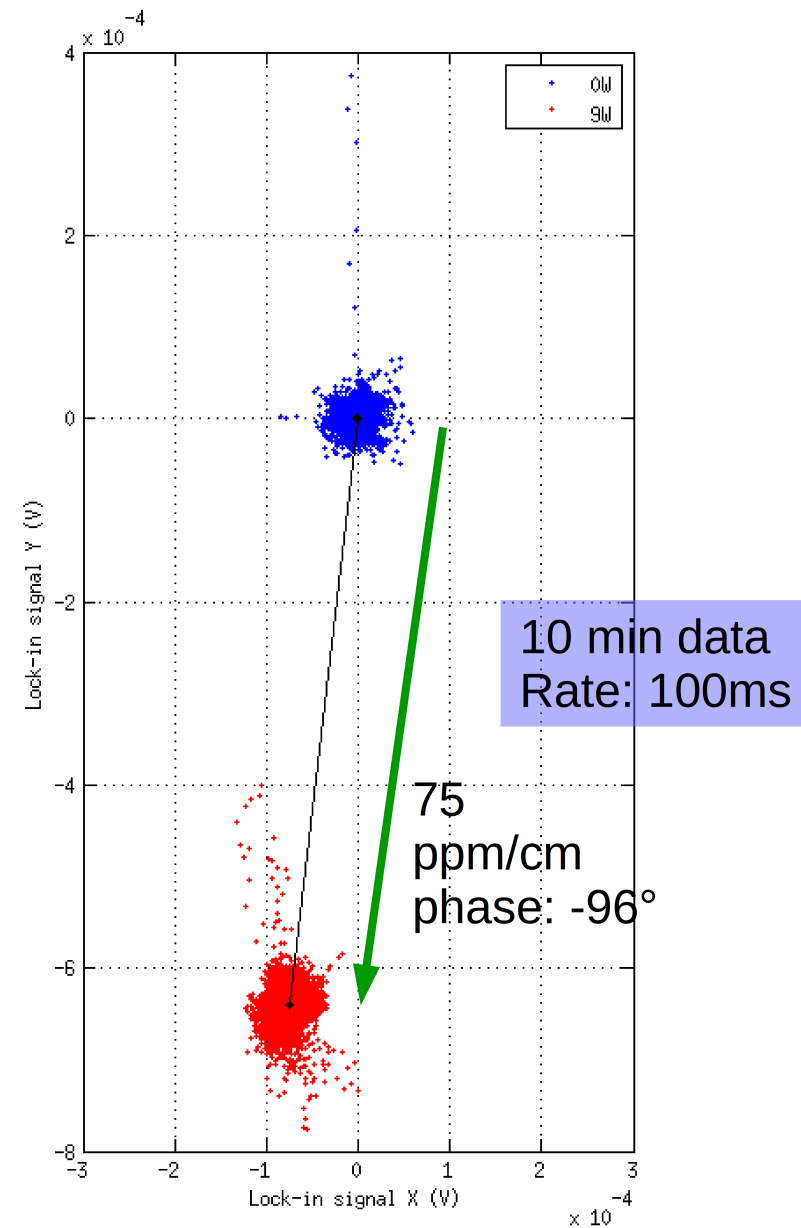


# RAW DATA (not filtered)

## Tama-size sapphire sample



## Small (1.5" diam) sapphire sample



## Conclusions:

- The refraction effect is important to determine the real position of the pump-probe cross point. For sapphire, a factor of 2 in the distance from the incidence surface.
- In the tama-size sample, phase filtering shows some signal: 3 ppm/cm, but the noise level is higher.
- Expected phase might change among different experimental conditions. It needs more investigation.
- Next step is to check how the expected phase depends on the chopper frequency.