

# **PHOTOLUMINESCENCE MEASUREMENT SETUP**

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## STANDARD OPERATING PROCEDURE

### LOADING THE SAMPLE

Ensure the cryostat temperature is at Room temperature, and was not operational for at least 4 hrs. Open the cryostat after venting to atmosphere/Nitrogen.

Remove old sample, if any. Apply a thin film of grease and stick the sample on to the sample holder.

Close the cryostat with shroud, connect to pump and start the pump. Ensure, the vacuum valve is now open to the pump.

Wait for at least 20 minutes, before switching ON the cryostat compressor.

Make sure the water chiller is ON. The cryostat compressor needs water chiller.

Switch OFF the heater, if it is enabled in the temperature controller

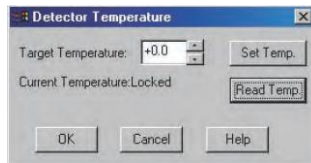
Switch ON the cryostat compressor and observe the current temperature starts to ramp down.

Wait for about 40 minutes, to reach 8K. Please note if there is any condensation on the outside of the cryostat. If any condensation is observed, switch OFF the cryostat immediately, and set the temperature to 300K.

### Cooling the detector

**For PIXIS:** Switch On PIXIS. Open winspec software. Go to Setup>Hardware and select the corresponding camera. Then go to Setup>Detector temperature, and set detector temperature to -81 deg C. PIXIS detector is cooled by Thermoelectric cooler to -81degC. It takes just about 15 mins to reach that temperature from room temperature.

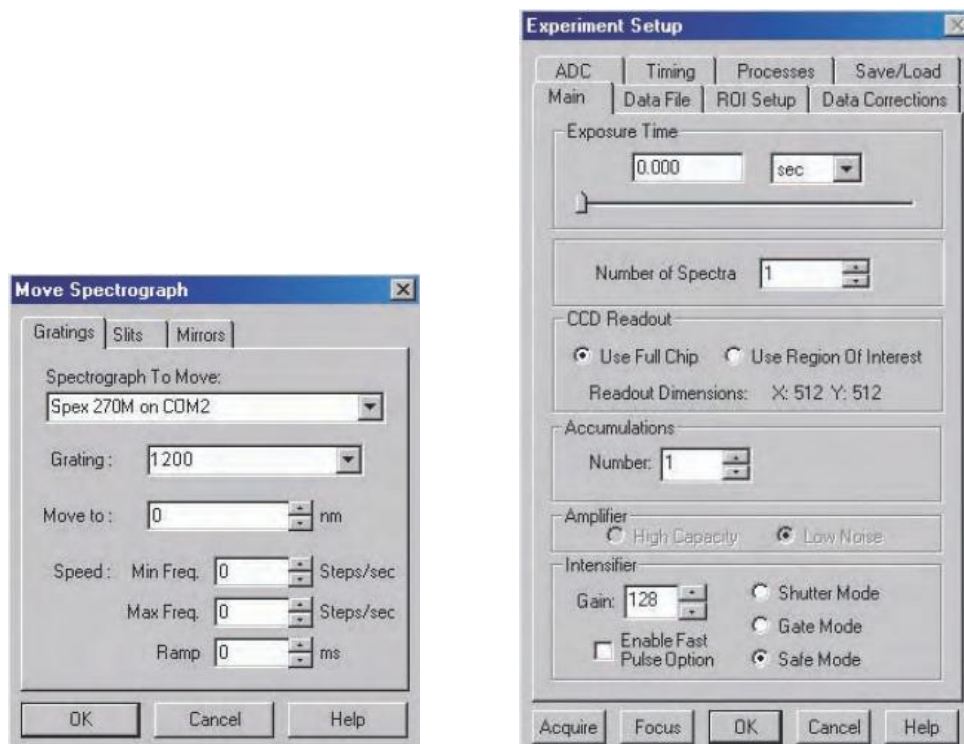
**For OMA:** Switch On OMA controller. Open winspec software. Go to Setup>Hardware and select the corresponding camera. Then go to Setup>Detector temperature, and set detector temperature to -100 deg C. OMA detector needs to be filled with LN and temperature set to -100deg C. It takes about 2 hours to reach -100deg C from room temperature. Open the dewar cap, using a funnel, pour about 100 ml of LN2 slowly. Wait for a minute till the vapour ceases. Pour slowly till the dewar is full. Slowly close the dewar. Do not switch OFF OMA controller when LN2 is still there in its dewar.



## Spectrometer Settings:

Open the Winspec software

Go to Spectrograph>Move, and choose the appropriate gratings using the winspec software



Check the hardware settings gain, digitization range, amplifier, depending on the detector, gain and grating used.

Choose appropriate lens depending on the wavelength of interest.

Enable the focus mode to stream live data so as to help in focusing.

## Focusing:

Switch ON the laser, adjust the lens so that the focal spot falls on the slit. Enable focus mode in Winspec software at a peak wavelength. Adjust the position of lens till the amplitude of the signal is maximized. If it saturates, reduce the exposure time, or gain, or decrease the slit width.

Find out the wavelength range of the signal by moving the grating to the extremes and observing the signal in the focus window. Then stop focusing, go to Acquisition>Step and glue and enter

the scan parameters and click 'Scan'. The file will be saved in the folder defined with the specified file name. IT can later be exported to .csv file and analyzed as required with any other third party plotting software like Origin.

**CAUTION:**

Always handle the sample and cryostat parts with great care. Always wear gloves when handling them.

Handle the optics carefully.

Never purge the cryostat when the temperature is below room temperature, and the cryo was operational till about 3 hrs before.

Never switch OFF the OMA controller, when there is LN2 in its Dewar.

Never switch OFF Spectrometer and/or the Camera when Winspec software is running.

**VIOLATION POLICY:**

If user is not following the above mentioned procedure, the authorization/usership shall be dismissed immediately till further consultation with Faculty incharge/Lab Manager.

**TRAINING POLICY:**

Due to complexity in the system operating procedure, training is currently not allowed.