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Development of a device to measure the light emitted due to the current of field effect

Luís H. T. Bandória*, Luiz F. Zagonel.

IFGW-Unicamp

Abstract

Some software were developed in *LabVIEW* with the aim of automating the acquisition of spectra from luminescent samples due to field emission current. The software enables the control of a *iHR320* spectrometer and a *CCD* camera *Syncerithy*, each having a graphical interface that enables both the choice of measurement parameters and the option to save the spectra being acquired in files in text format

Key words:
LabVIEW, Automating, Control

Introduction

This project is part of a larger project whose goal is to use a *Scanning Tunneling Microscope* to analyse the characteristic emission spectra of luminescent samples, especially of nanostructured materials.

The objective of this project is to use the *LabVIEW* language to develop some software that automate the spectra acquisition process from luminescent samples excited by the *Scanning Tunneling Microscope*. This automation is through the control of parameters of a spectrometer and a *CCD* camera that allows us, as well as precise control of the equipment, acquire a time sequence of spectra according to predefined parameters.

Results and Discussion

The software developed to control the spectrometer *iHR320* has the interface shown in Figure 1.

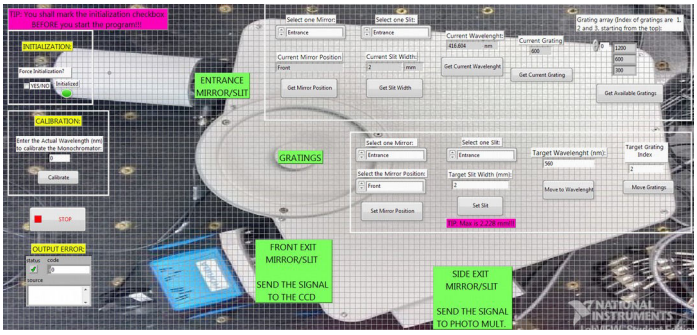

Figure 1. *VI*'s interface for the spectrometer. They can be observed all the parameters that are controlled by software.

Using this software along with that one that was developed for the CCD camera we acquired the characteristic emission spectrum from a neon calibration lamp. The spectrum, with the *CCD* pixels already converted to Wavelength , is shown in Figure 2.

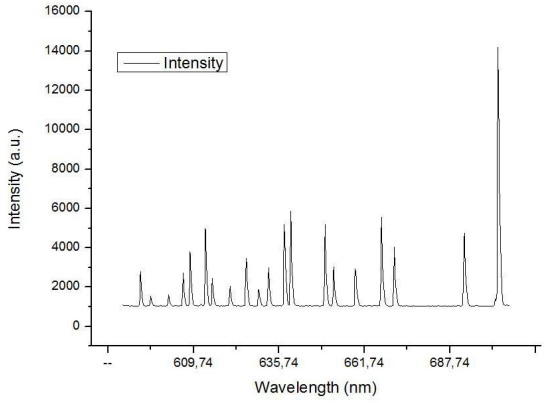

Figure 2. Spectrum acquired with our software for the neon calibration lamp.

By having a clearly defined emission spectrum we can compare the spectrum that was acquired with our software with those in the literature and thus verify that our software are operating correctly. Performing this comparison we saw that our spectrum is exactly equal to the characteristic spectrum in the literature. The software will have specific modules to allow for taking series of measurements as function of other parameters such as time or the voltage applied to a power supply, for instance.

Conclusions

Software developed throughout the project are operating satisfactorily, which can be verified by comparing the spectrum acquired for the neon lamp using our software with the expected spectrum that is in the literature, and noting that both are equal.

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