

# Automation of Optical Spectrometer

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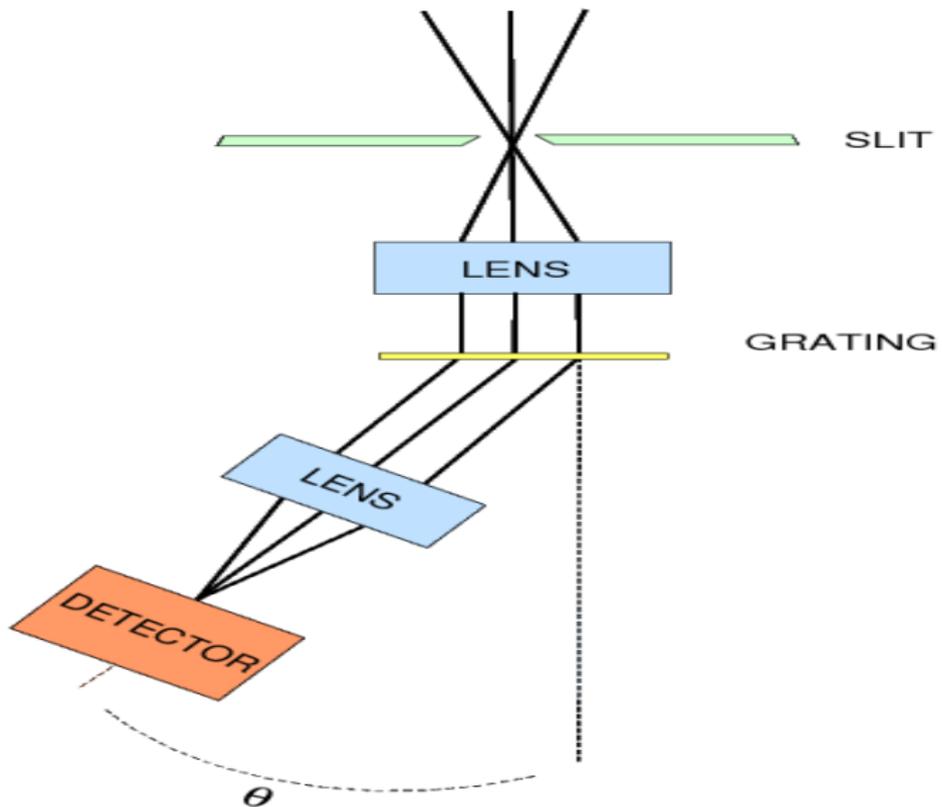
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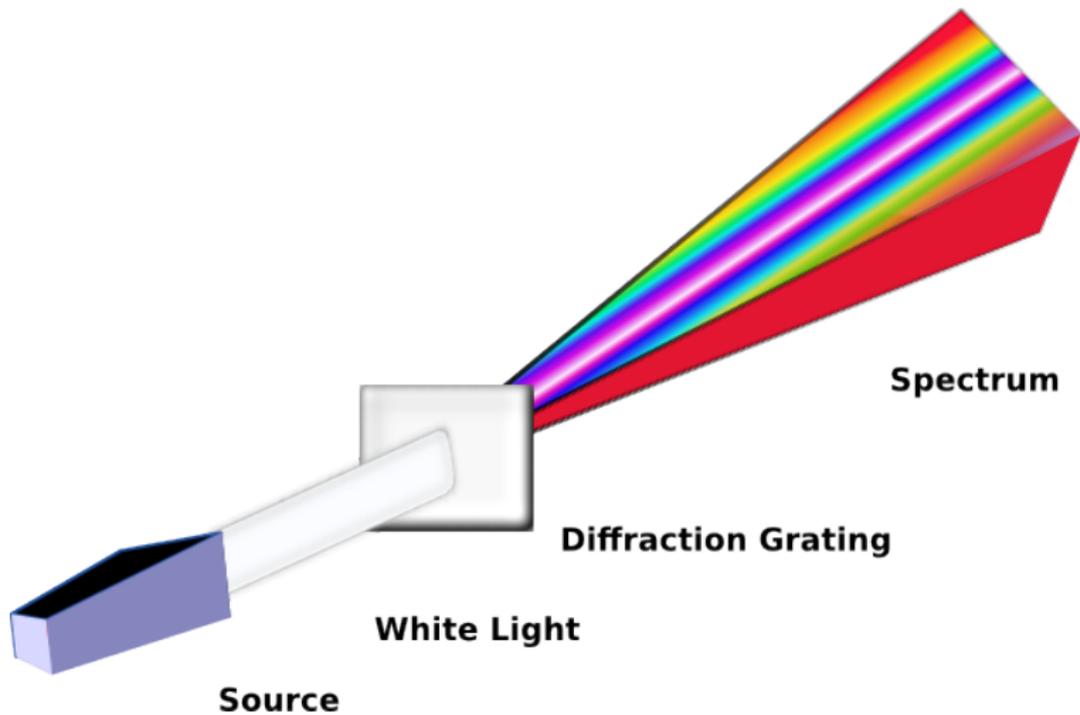
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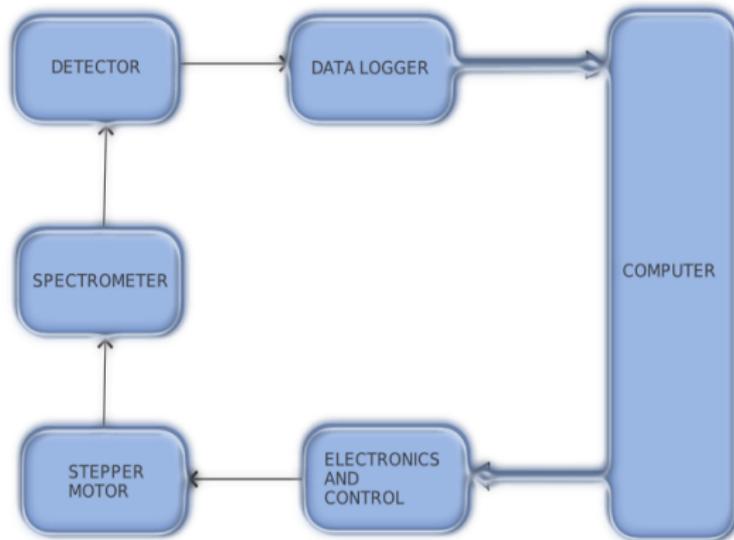
- “AUTOMATION OF OPTICAL SPECTROMETER” is an attempt to build an optical spectrometer which is computer interface-able and which scans angle, in turn, calculate wavelength.

# Spectrometer Schematic Diagram





# Block Diagram

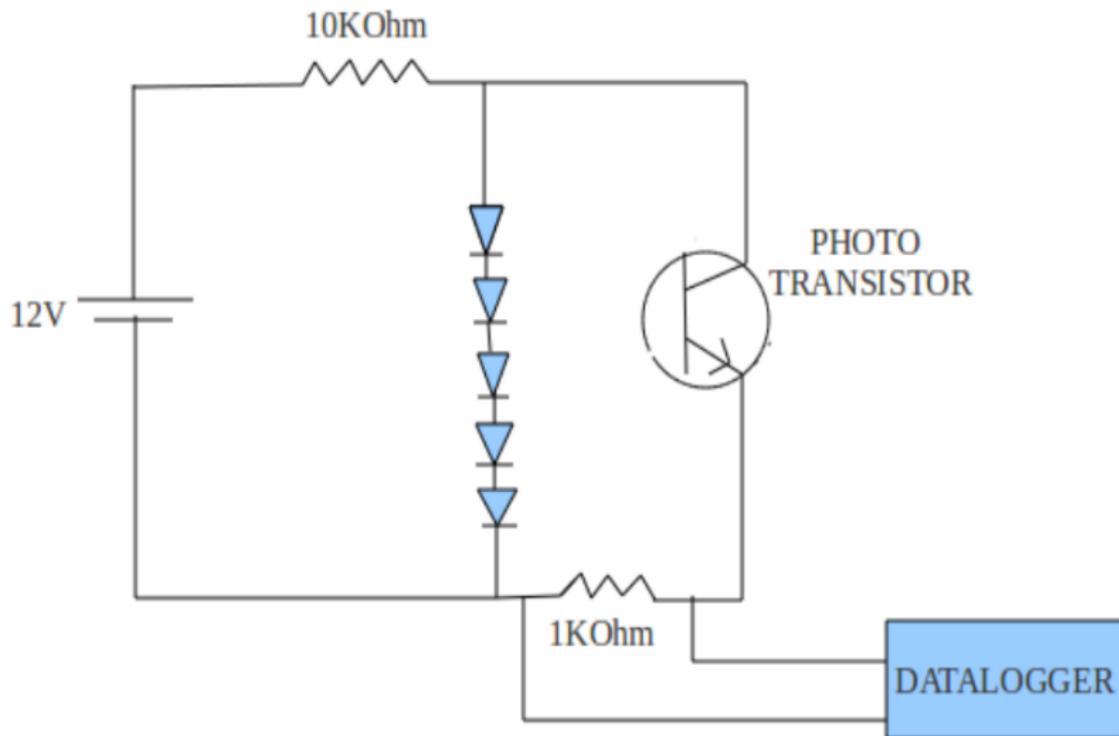


- A stepper-motor is used to turn the Photo transistor(Detector). A circuit has been built with a Photo transistor to detect light.
- Data-logger is used for data acquisition.
- Interfacing with the computer has been done with IPython(Interactive Python) on a LINUX environment.

# Spectrometer shown with photo transistor detector mounted on a pipe

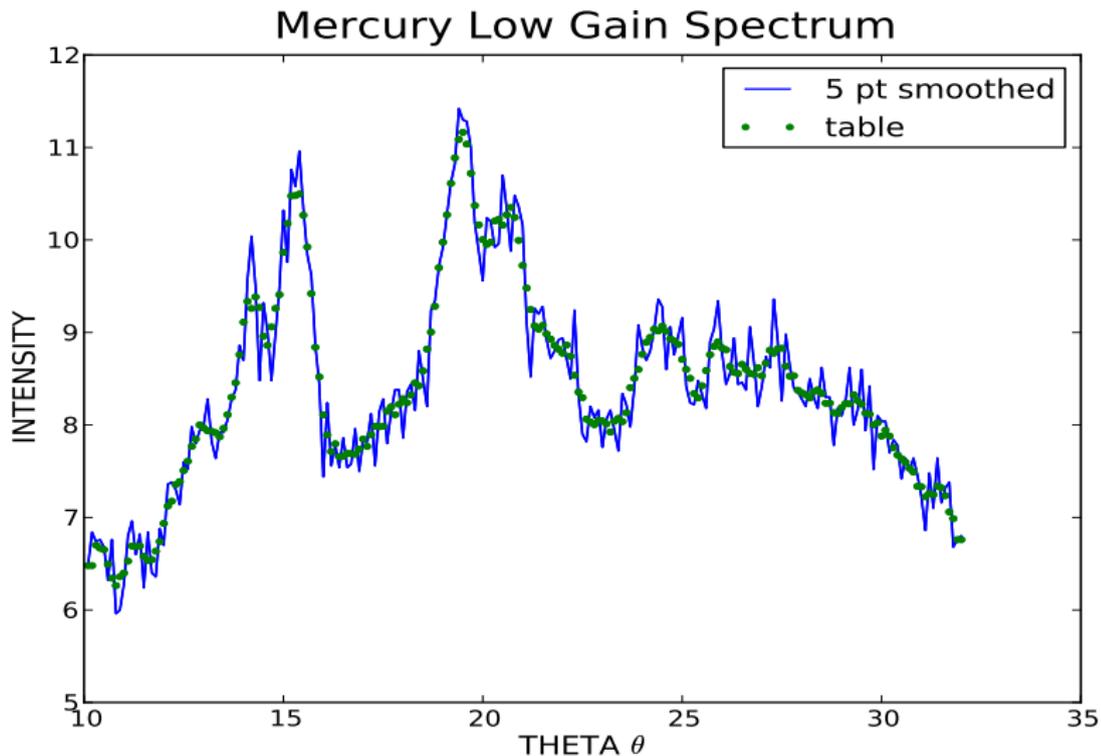


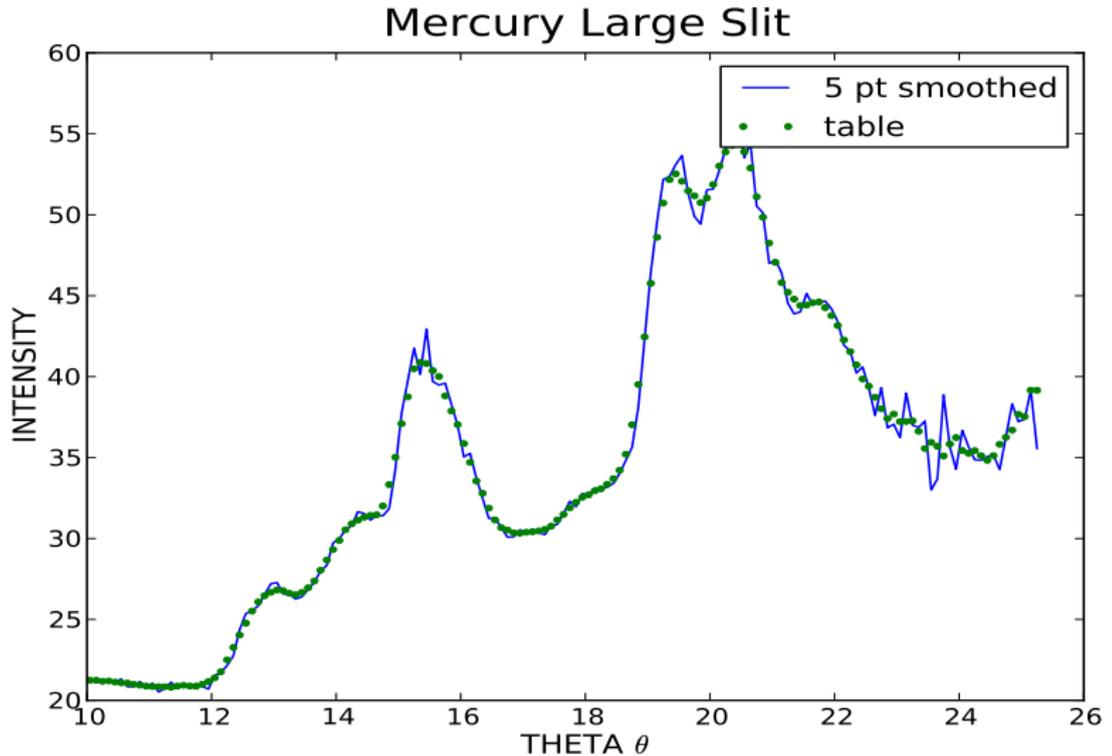
# Photo transistor(Detector) Circuit Diagram



- Stepper motor and the Data Logger are configured on two different serial ports.
- PySerial python library is used for serial communication.
- The serial port of the stepper motor is hooked to port 0 of the computer with baud rate 9600  
**serial.Serial('/dev/ttyS0', 9600, timeout=0.5)**
- The serial port of the data logger is hooked to port 2 of the computer with baud rate 9600  
**serial.Serial('/dev/ttyS2', 9600, timeout=0.5)**

- Data from the data logger is acquired in the computer. This data is plotted using matplotlib library.  
**plot(x,y,'color')**
- When the data is non averaged and the detection system has low gain the plot is just a profile which shows up as scatter





- Averaged spectrum for larger gain gives good results for small slit widths. Use of CCD camera will enhance sensitivity.

COLOUR	$\theta$ Expected	$\theta$ obtained
Violet	14.28	14.3 +/- .1
Blue	15.29	15.8 +/- .1
Green	19.29	19.0 +/- .1
Yellow	20.51	21.0 +/- .1
Red	23.53	24.1 +/- .1

- The data obtained is close to the expected value and hence the calibration is good.

Thank You!

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