



Monochromator Setup Components & Measurements - 6

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Topics

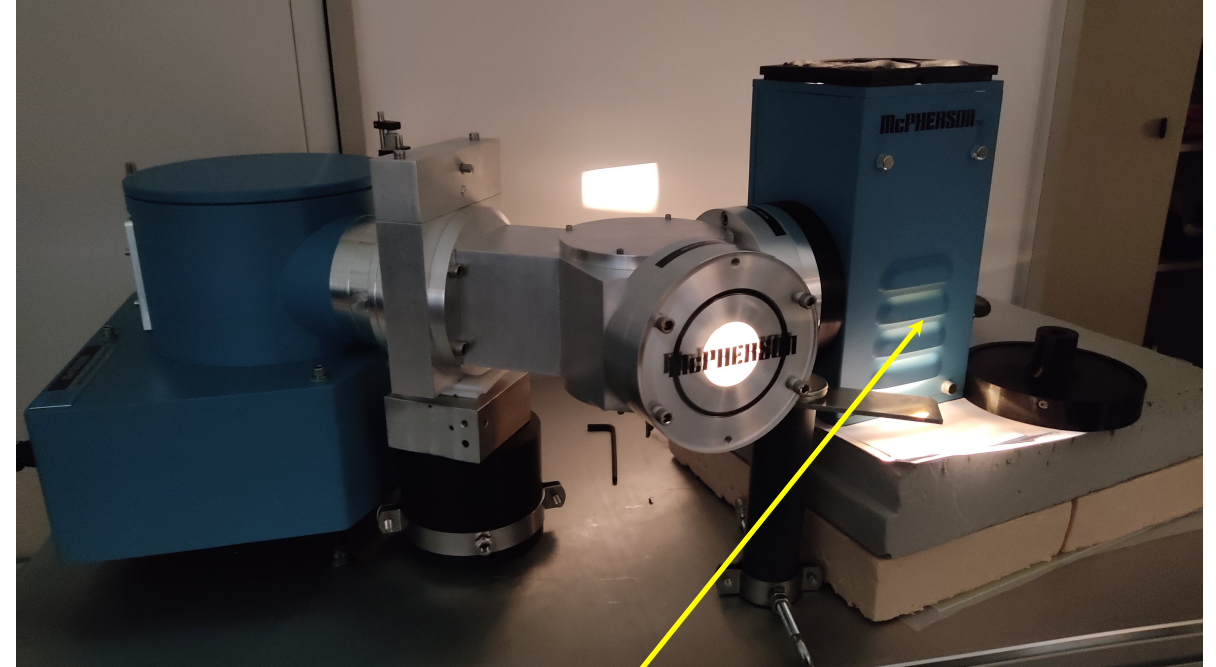
- Lamps
- Filters
- Light Characterization by Meritxell Garcia @ IFIC
- Future measurements

Operation conditions of the lamps



D2 lamp: should be operated in vacuum

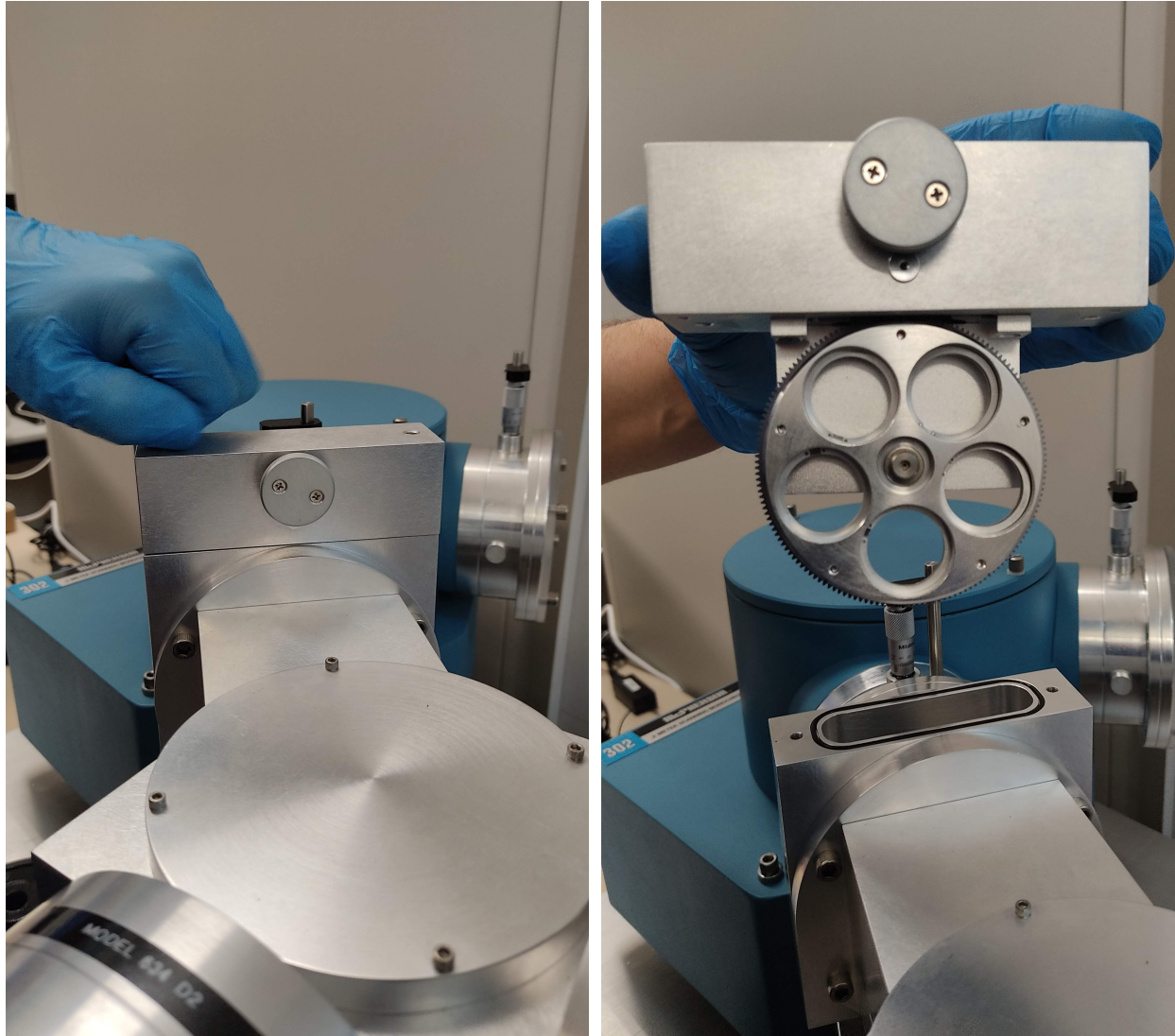
Operation in air should be avoided: It creates build-ups in the MgF₂ window and instabilities in the light output. Requires N₂G cleaning.



Tungsten lamp operation in air and at 12 V

CAUTION: DO NOT EXPOSE YOUR EYES and SKIN TO THE LAMPS (strong UV component is damaging)

Filter wheel and long pass filters



Two Long pass filters

Used to suppress the second order component of the light at the selected wavelength λ .

This is the component of half the wavelength value. Example: if 250 nm selected, the second component is of 125 nm.

400 nm Long pass filter position: 3

225 nm long pass filter position: 4

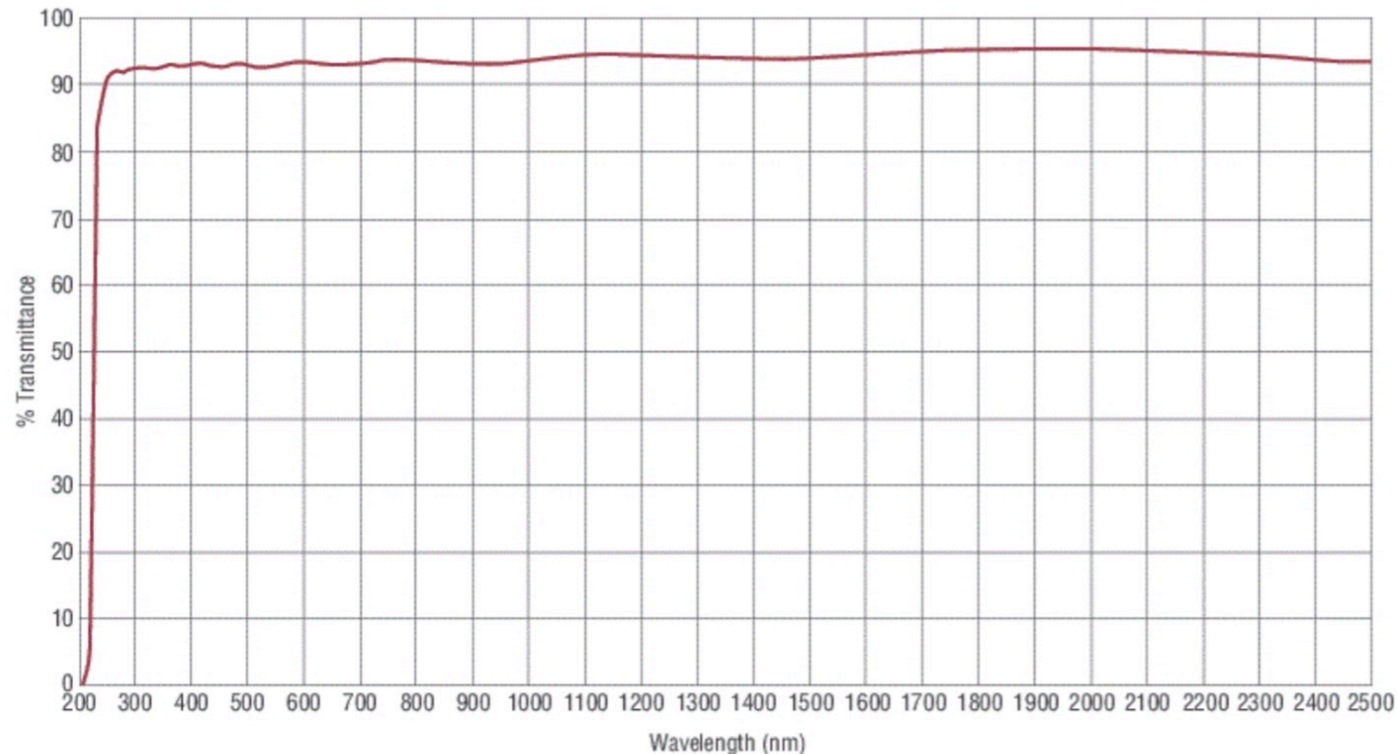
NO FILTER : Positions 1,2 ,5

Long pass filters spectra – 225 nm



225 Long Pass Filter

225 nm long pass filter position: 4



Suppresses 2nd order light components < 225 nm from the grating.

Example: if 250 nm selected, the filter suppresses the 125 nm component from the light output. This 2nd component effect is important in vacuum, according to McPherson

Long pass filters spectra – 400 nm

Newport

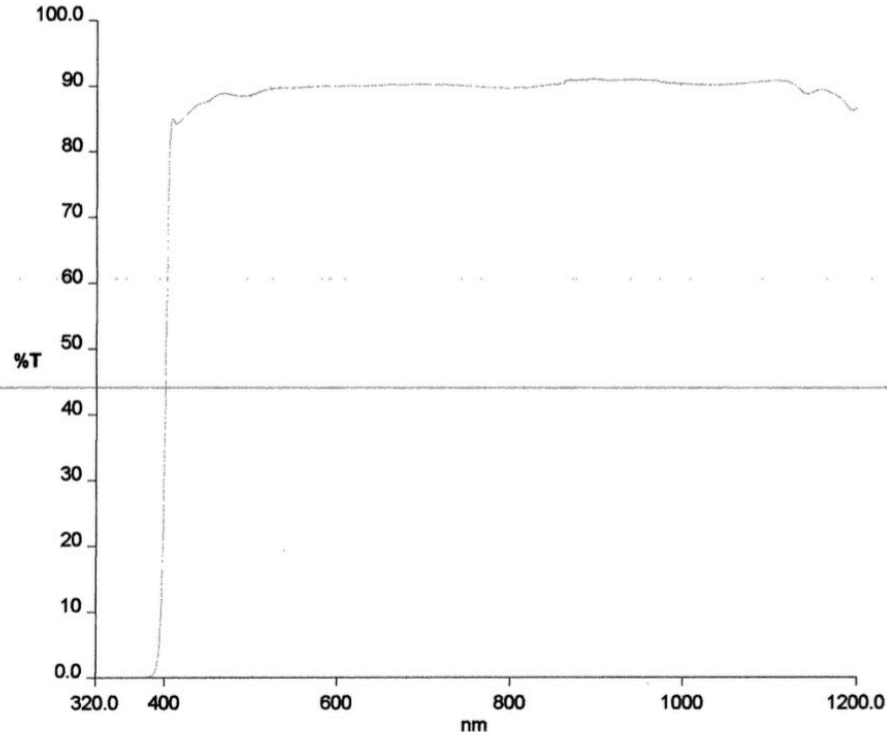
REPRESENTATIVE LOT DATA

CUSTOMER : _____

PART NUMBER: 1DLWF-400-B

NEWPORT LOT NUMBER: A4129

MEASUREMENT DATE: 9-22-2010



Method : 11400tb.mfx
Information :
Date : 22-Sep-10

Analyst : MG
Time : 08:22 AM

Spectrum CUT-ON 80% min AVERAGE 410nm to 1200nm

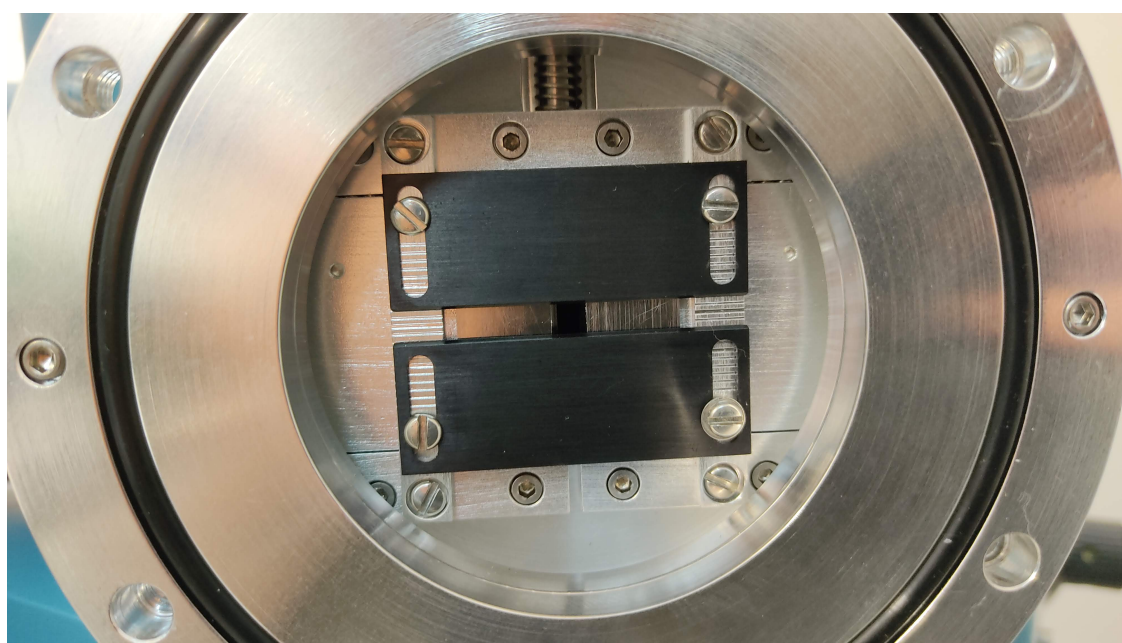
1.SP 400.50 89.54

400 nm long pass filter position: 3

Suppresses 2nd order light components < 400 nm from the grating.

Example: if 400 nm selected, the filter suppresses the 200 nm component that will also be present in the light output.

Input and Output Slits of the Monochromator



EXIT slit

Height : 20 mm (fixed)
Width : 3 mm max (3000 mum)

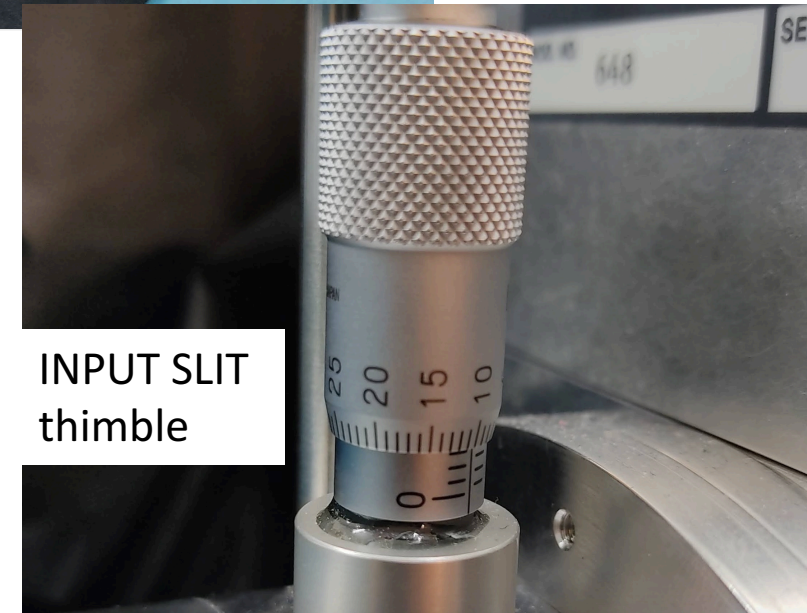
Width is set using the slit
thimbles
(mechanical or software control)



EXIT SLIT
thimble

Thimbles

Divisions : 50 division/turn
1 division : 10 mum
5 divisions : 50 mum
1 turn : 500 mum



INPUT SLIT
thimble

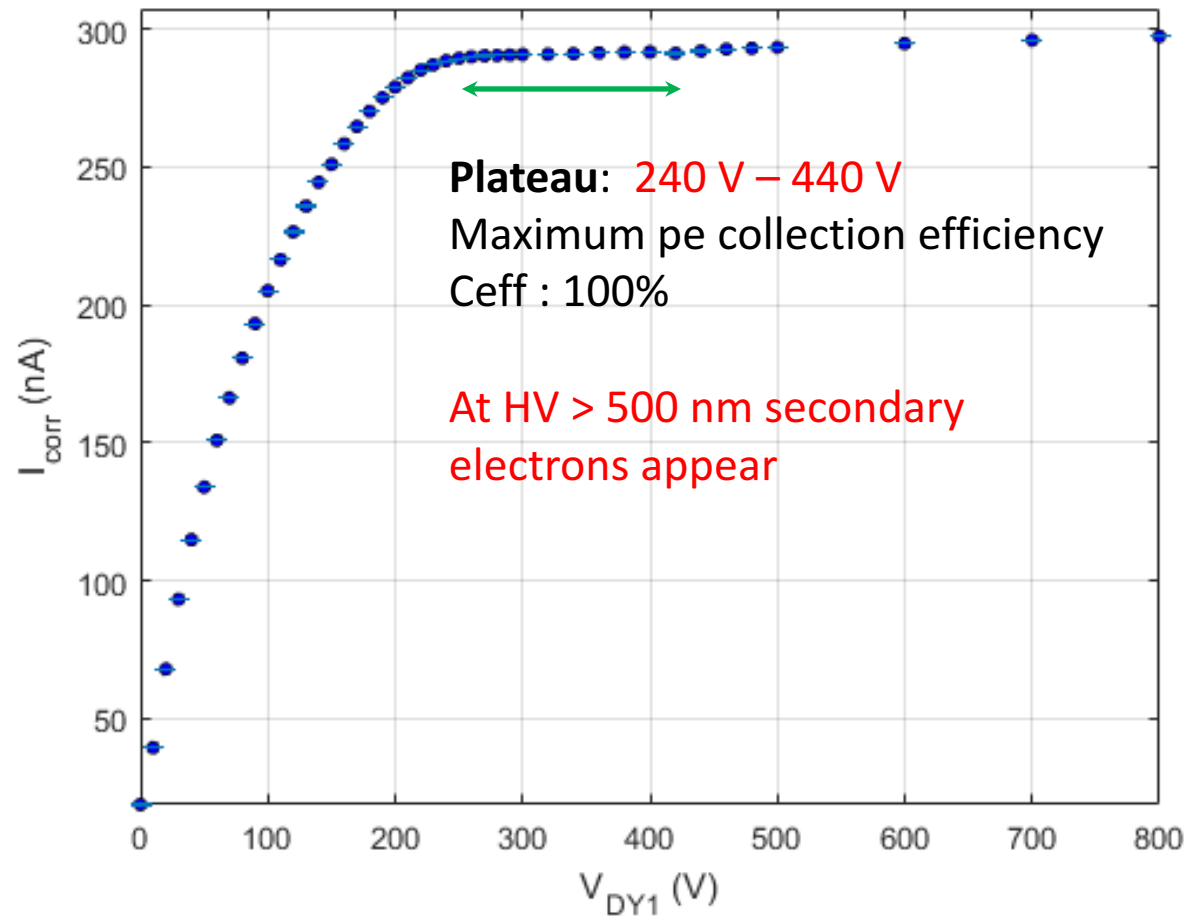
Measurements by Meritxell Garcia



First measurements

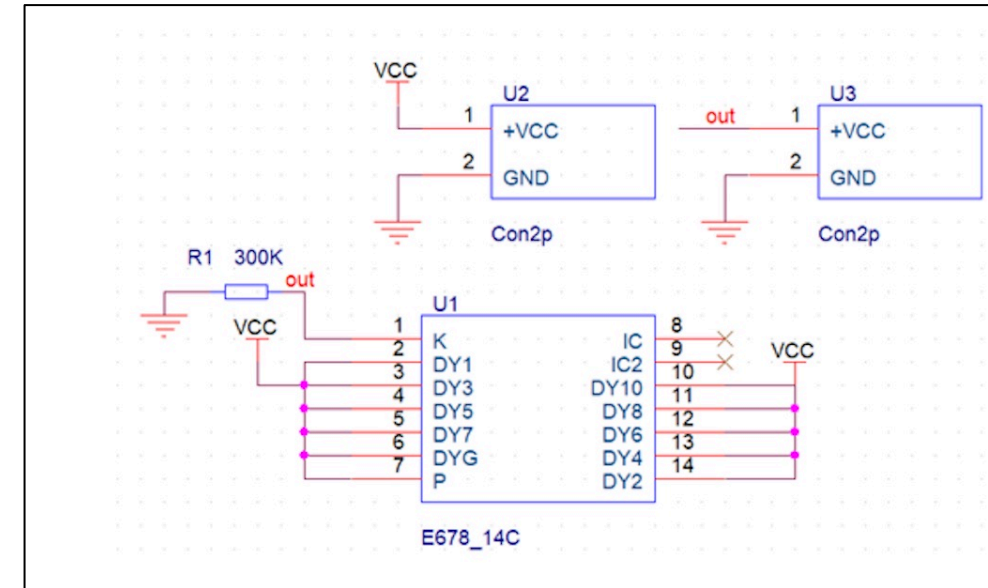
- Plateau curve of the calibrated PMT
- Light spectrum of Tg lamp
- Light intensity versus exit slit opening

Calibrated PMT plateau curve



Plateau: 240 V – 440 V
Maximum pe collection efficiency
Ceff : 100%

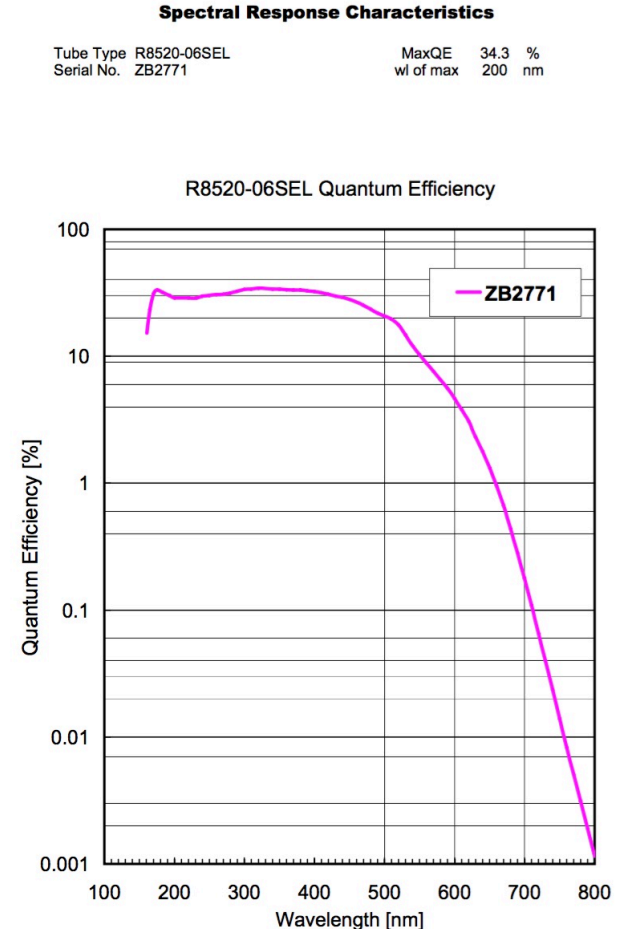
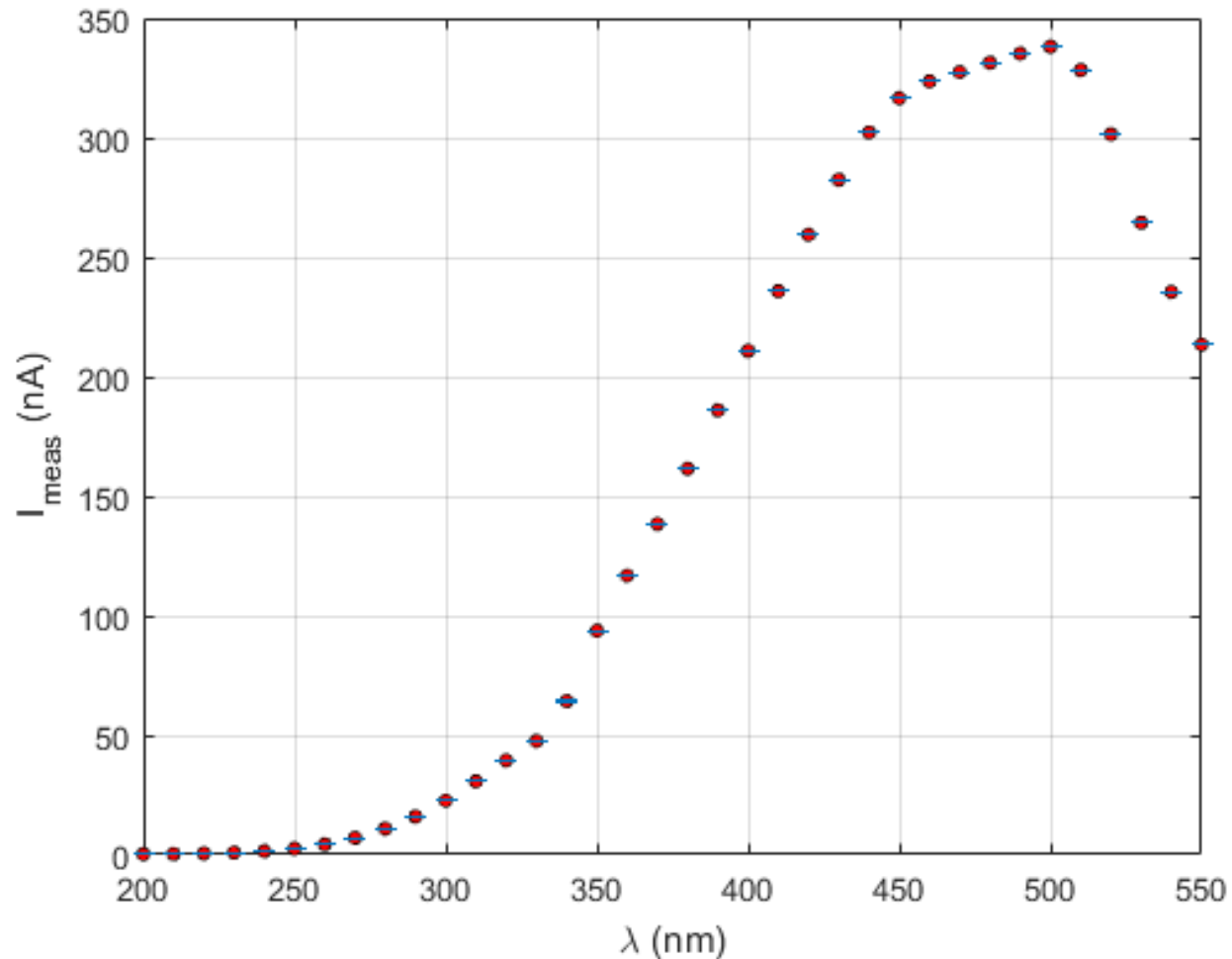
At HV > 500 nm secondary
electrons appear



PMT base: aimed at allowing photocurrent
measurements
(Current from Photocathode, without gain)

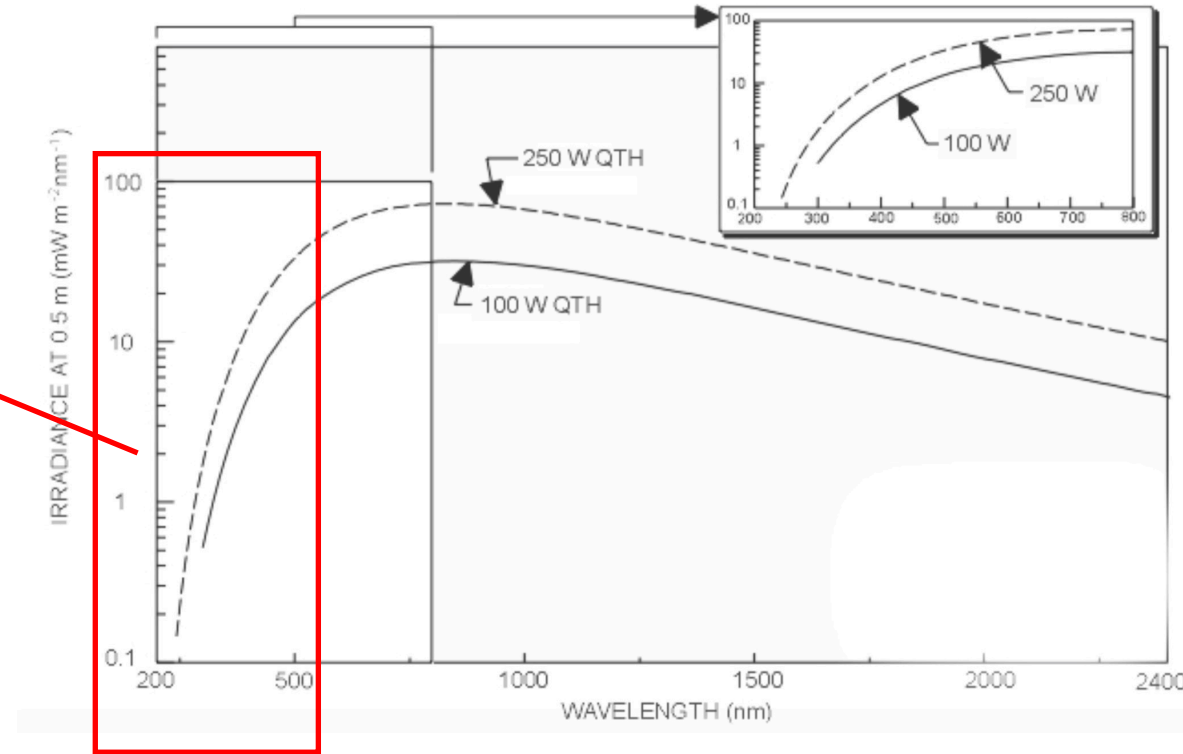
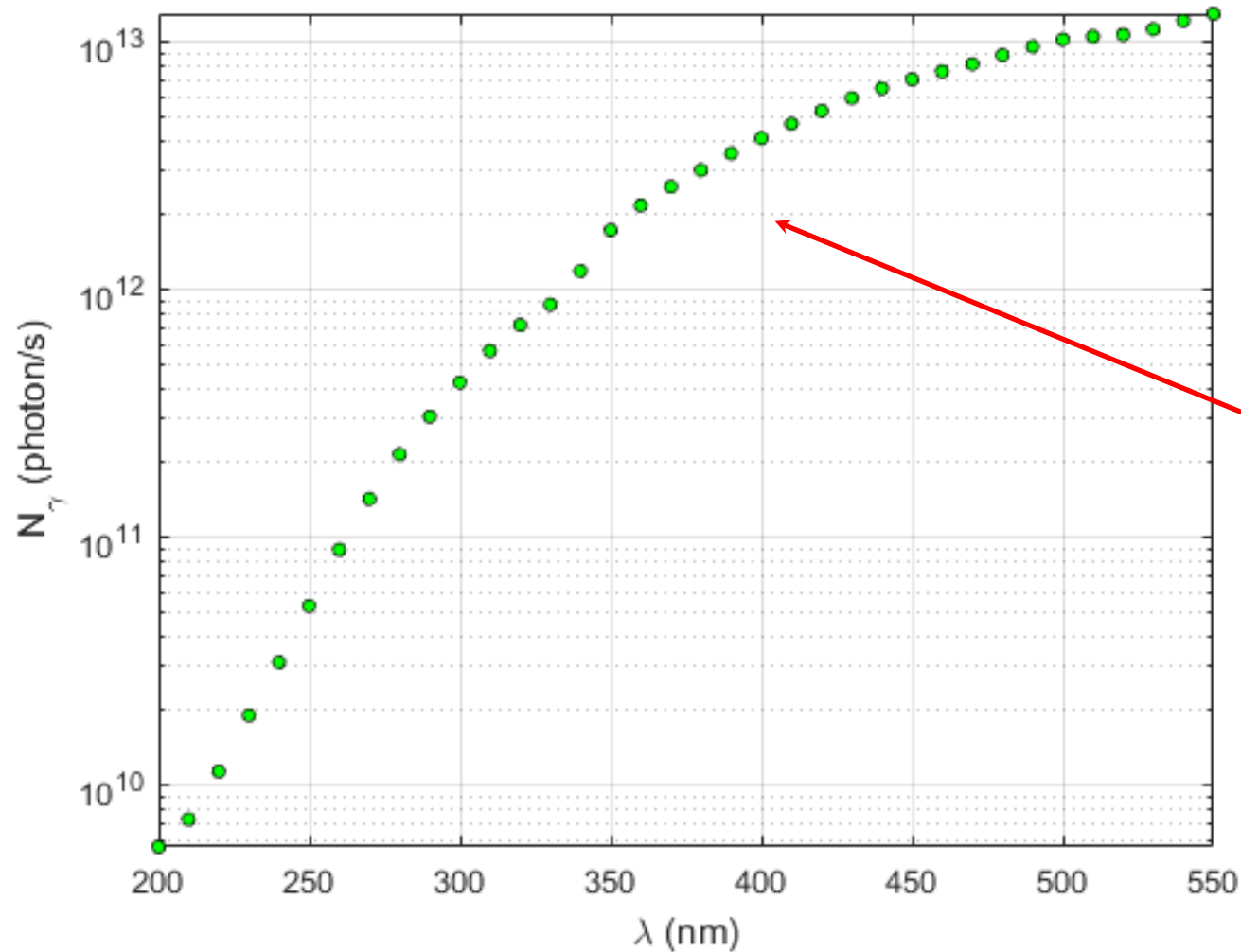
Aim of the plateau curve: determine the operation voltage of the PMT for
Photocurrent measurements. **Input and output slits wide opened.**
Wavelength 435 nm

Tg lamp emission spectrum (current nA)



Measurement of the MC output current vs wavelength. Input and Output slits wide opened: 3 mm width. PMT operation voltage 250 V

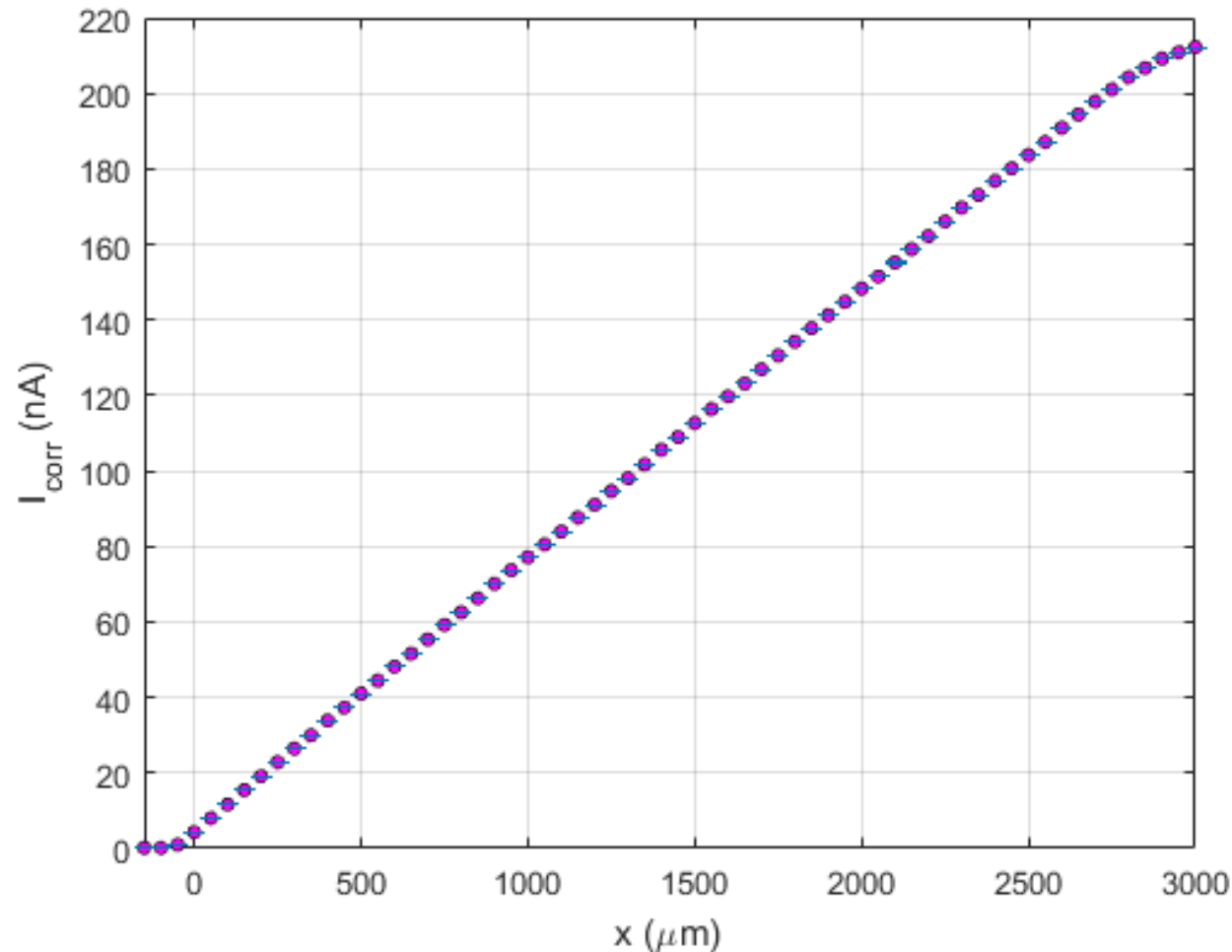
Tg lamp (100W) emission spectrum (photons/s)



From McPherson

Measurement of the MC output current vs wavelength. Input and Output slits wide opened: 3 mm width. PMT operation voltage 250 V

Light output vs exit slit opening (current nA)



Output Intensity versus exit slit opening is linear, except near the maximum and minimum openings

Measurement of the MC output current vs wavelength. Input slit wide opened,
exit slit : from 3 mm down to zero
PMT operation voltage 250 V. Wavelength : 550 nm (maximum intensity)

Next tasks

- Characterization of the monochromator + Tg lamp at ICMOL:
tomorrow 25 March
- Manufacturing of N2G box for operation with the D2 lamp:
next week
- Finish to setup the software control of the monochromator:
next week
- Finish the mechanical fixing of the MC system + N2 box
max 2 weeks from now