



Light measurements to characterize the monochromator

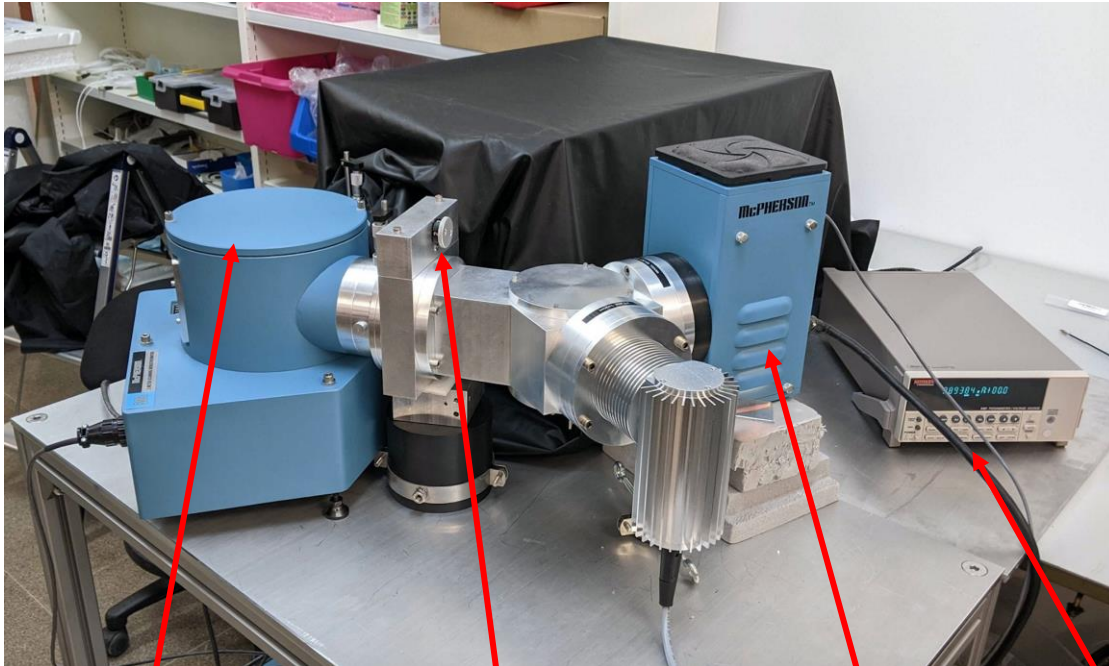
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7/04/2022

Topics:

- Monochromator setup
- PMT Plateau curve
- Tg lamp emission spectrum (PMT)
- Tg lamp emission spectrum (spectrometer-ICMOL)
- Tg lamp emission spectrum comparison (normalized)
- Light output as a function of exit slit opening
- Peak width variations with IS and OS (Julio's plot)
- Future measurements

Monochromator setup:

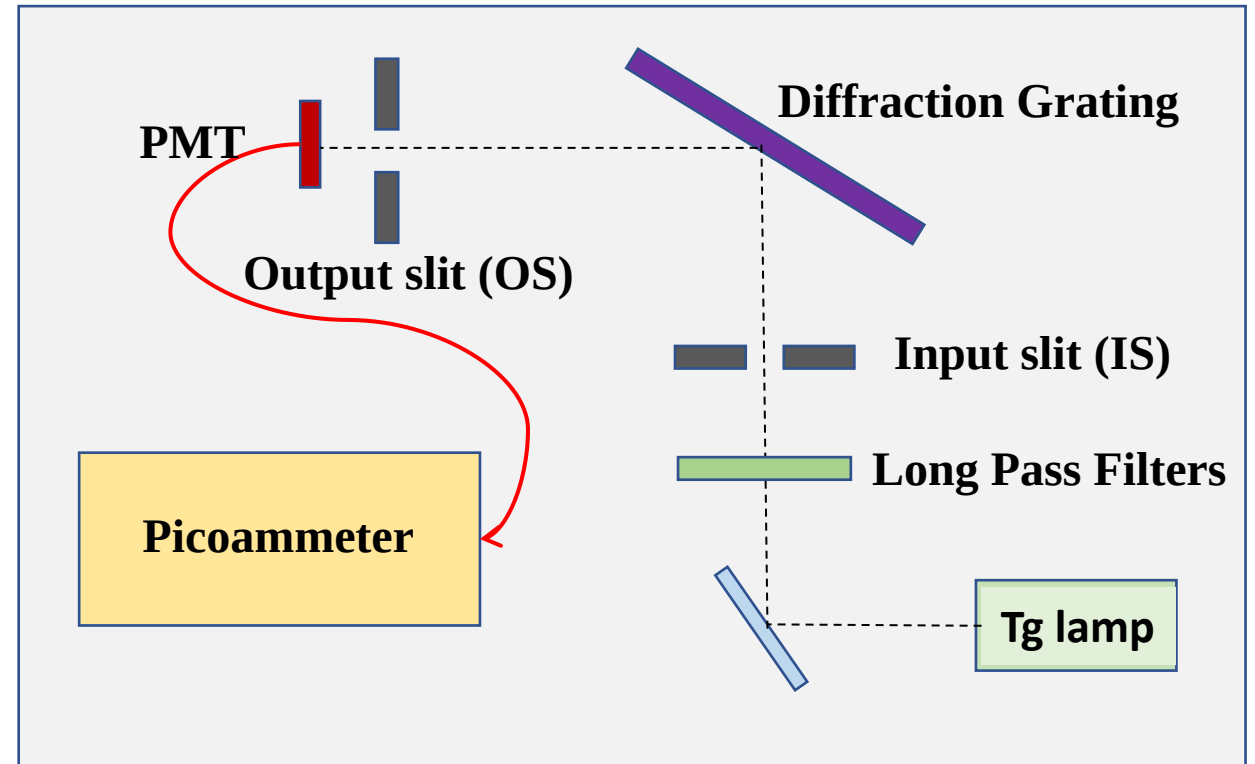


Diffraction Grating

Long Pass Filters

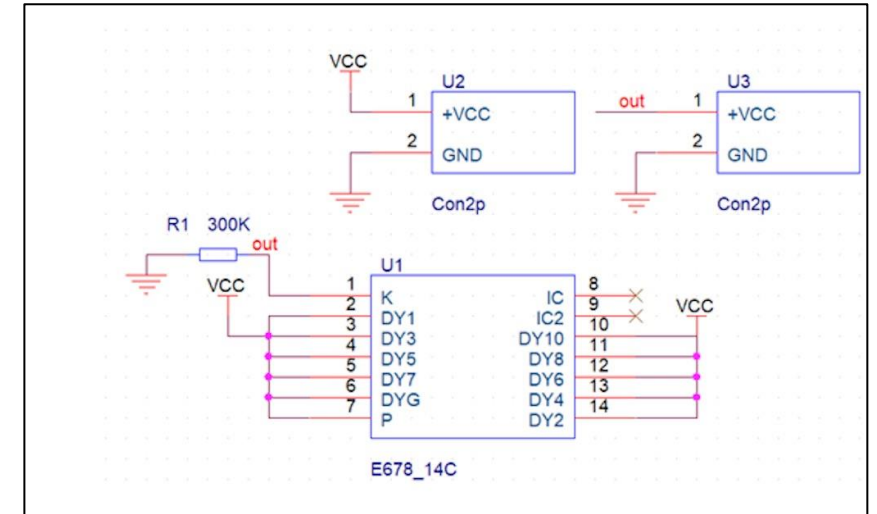
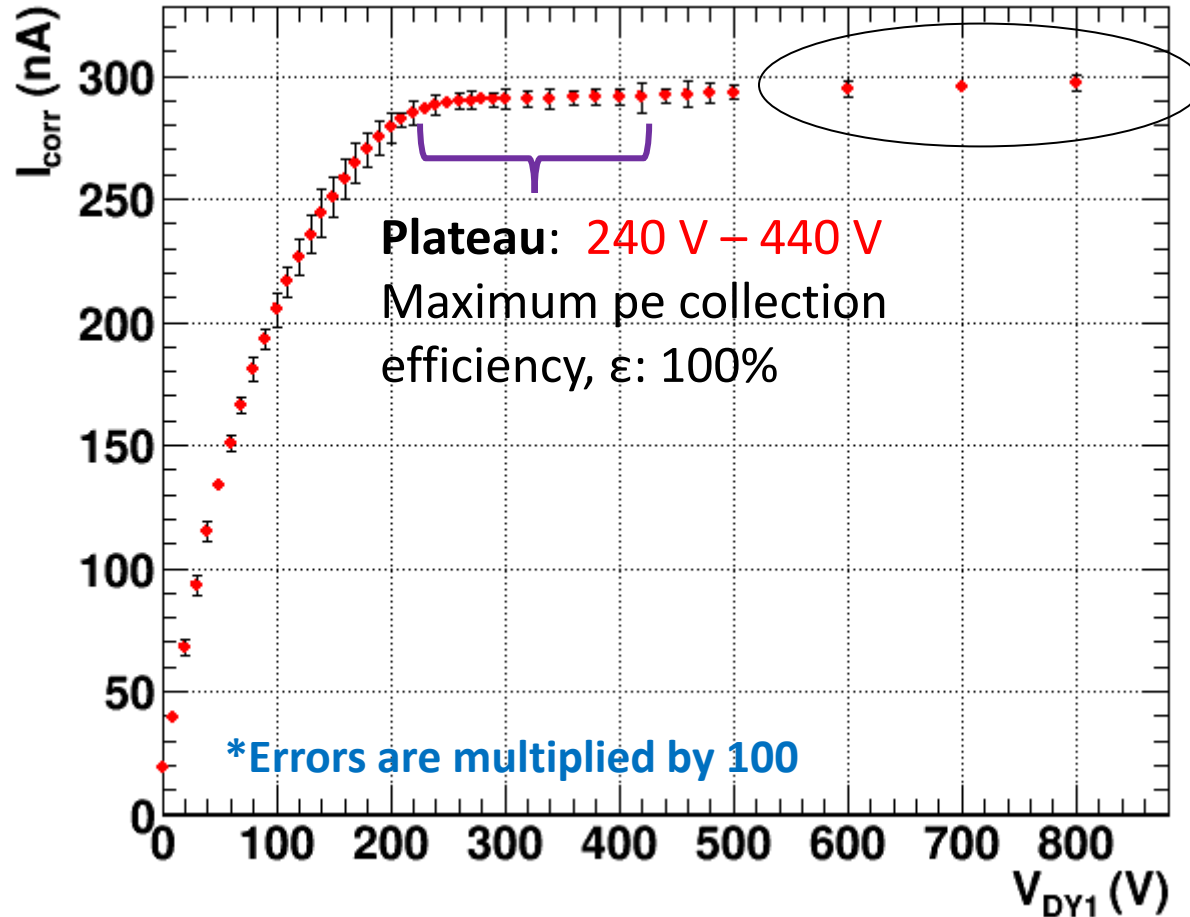
Tg lamp

Picoammeter



PMT Plateau curve:

V > 500 V: Appearance of secondary electrons

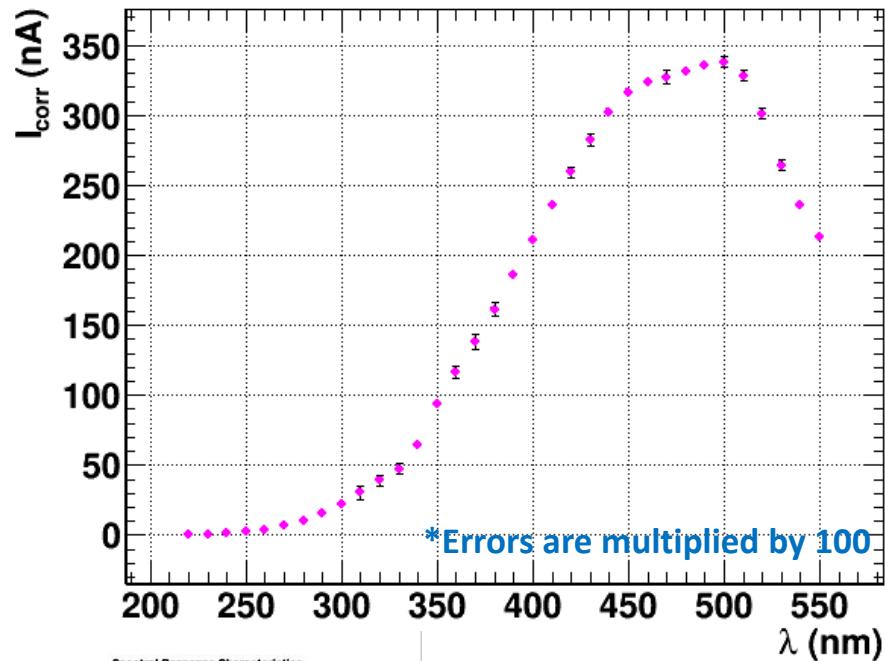


PMT base: aimed for photocurrent measurements
(Current from Photocathode, **without gain**)

Operating voltage: 250 V

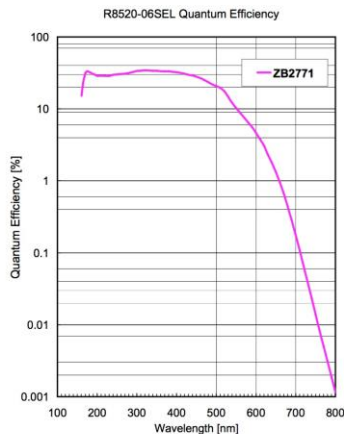
Aim of the plateau curve: determine the operation voltage of the PMT for Photocurrent measurements. **Input and output slits wide opened.**
Wavelength 435 nm

Tg lamp emission spectrum (PMT):



Spectral Response Characteristics
Tube Type R8520-06SEL
Serial No. ZB2771

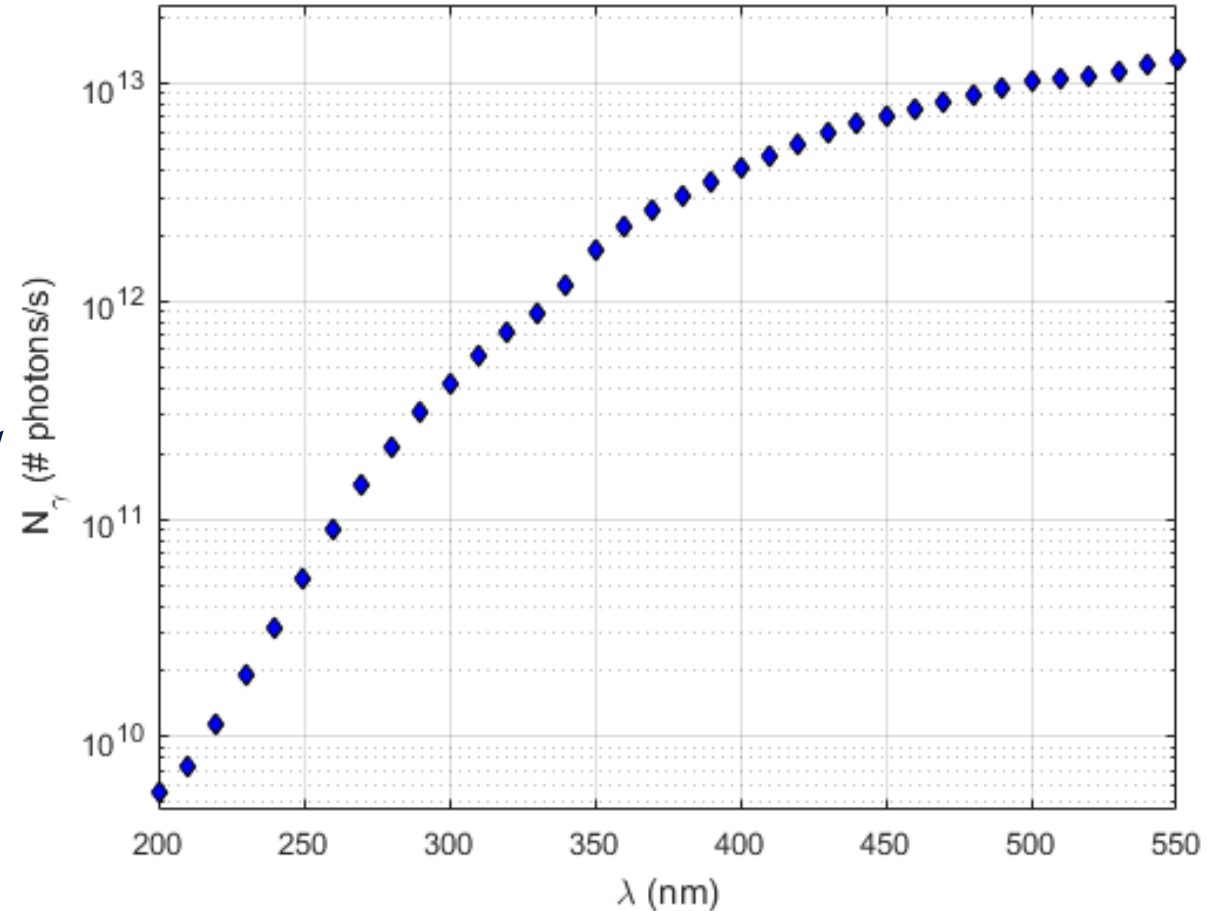
MaxQE 34.3 %
wl of max 200 nm



$$N_{\gamma} = \frac{I_{corr}}{\varepsilon e G Q_e}$$

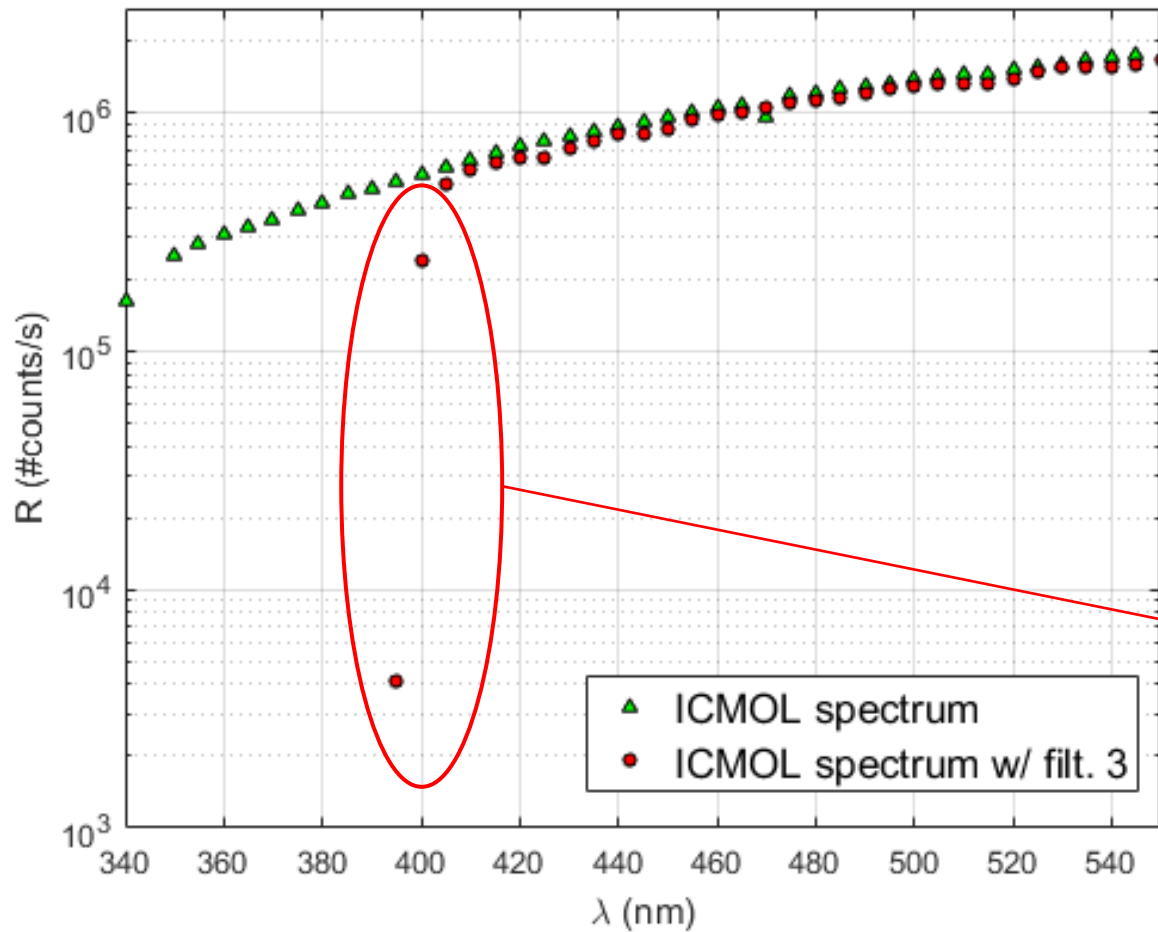
G = 1: no gain

$\varepsilon = 1$: maximum pe
collection efficiency



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

Tg lamp emission spectrum (spectrometer-ICMOL):



Gaussian integral vs wavelength (exposure time: 90 ms)

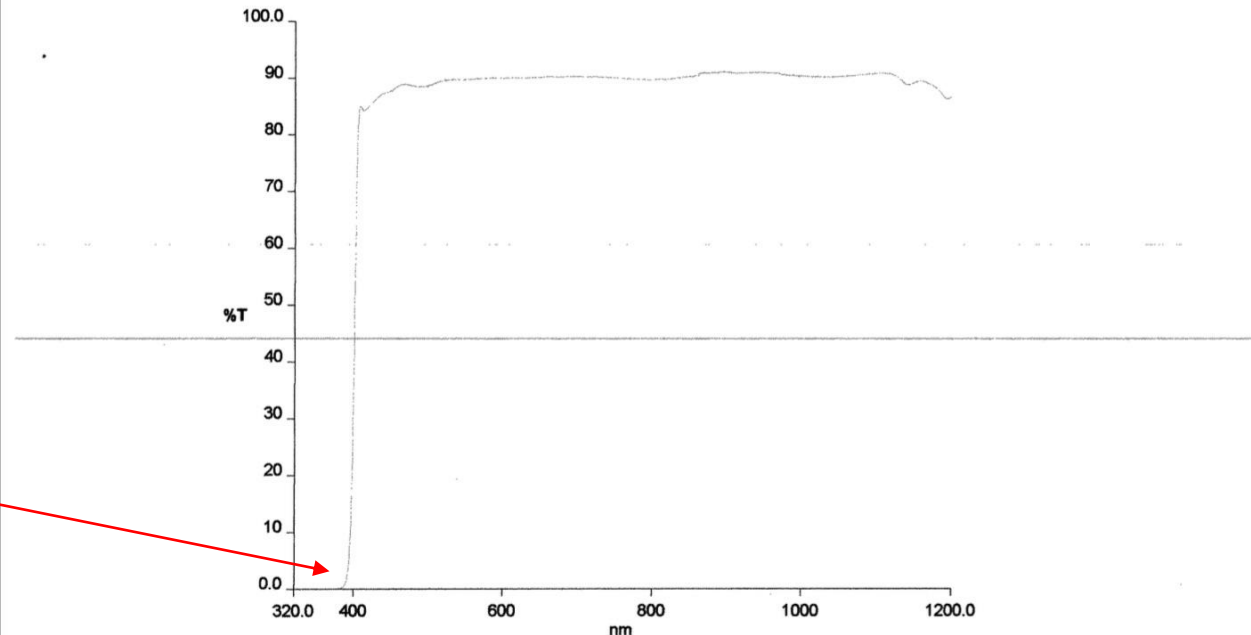
Input slit: 0 mm

Output slit: 0.5 mm

Newport

REPRESENTATIVE LOT DATA

CUSTOMER : _____
PART NUMBER: 1DLWF-400-B
NEWPORT LOT NUMBER: A4129
MEASUREMENT DATE: 9-22-2010



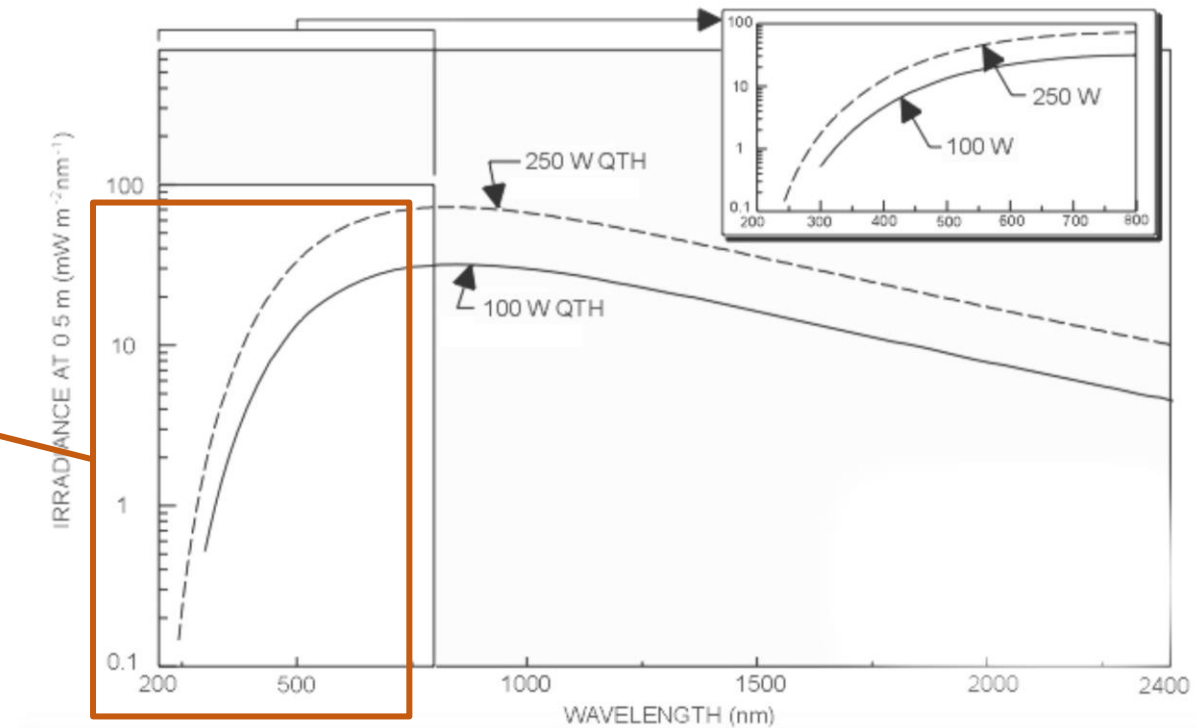
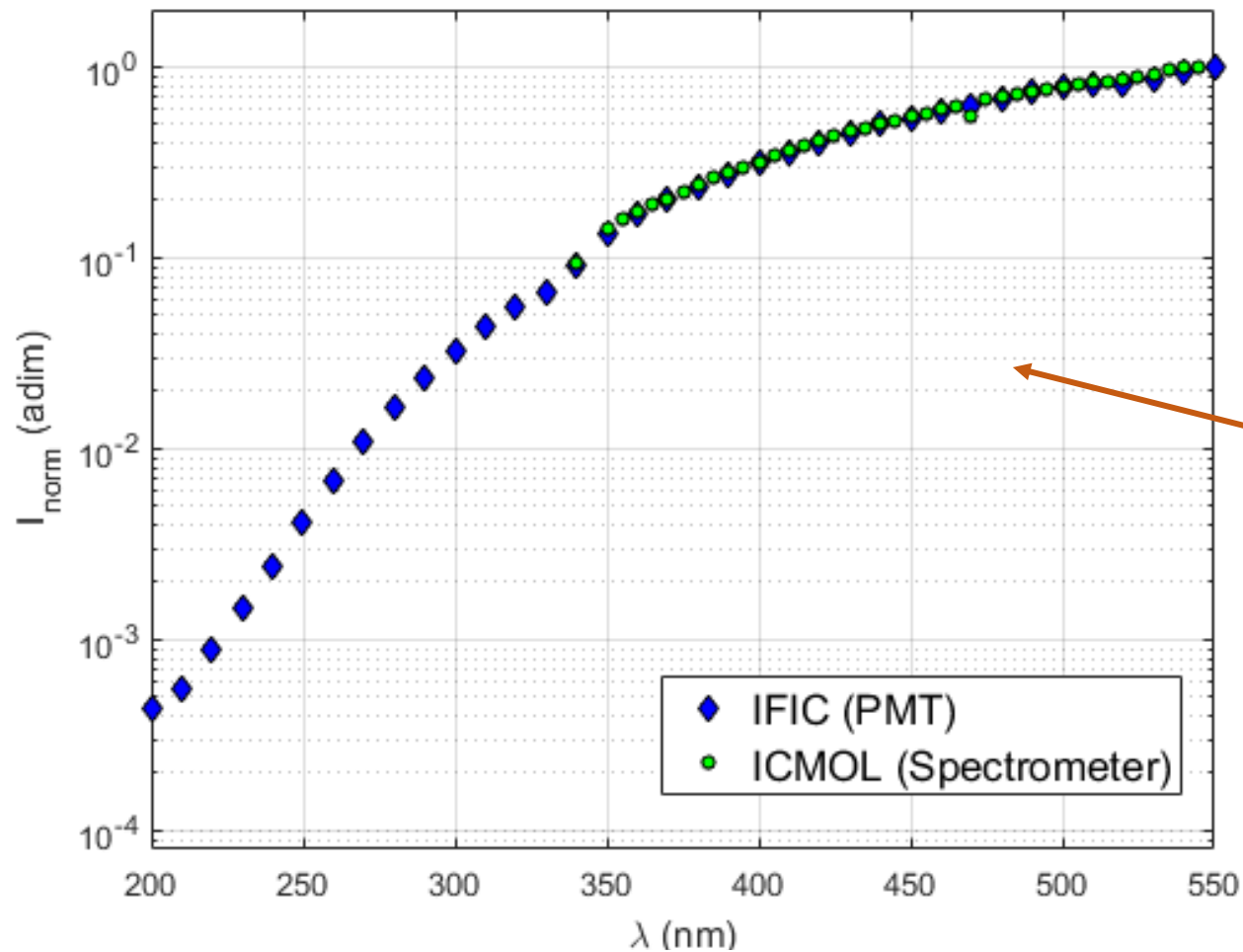
Method : 11400tb.mfx
Information :
Date : 22-Sep-10

Analyst : MG
Time : 08:22 AM

Spectrum CUT-ON 80% min AVERAGE 410nm to 1200nm
1.SP 400.50 89.54

Filter 3: 400 nm Long pass filter

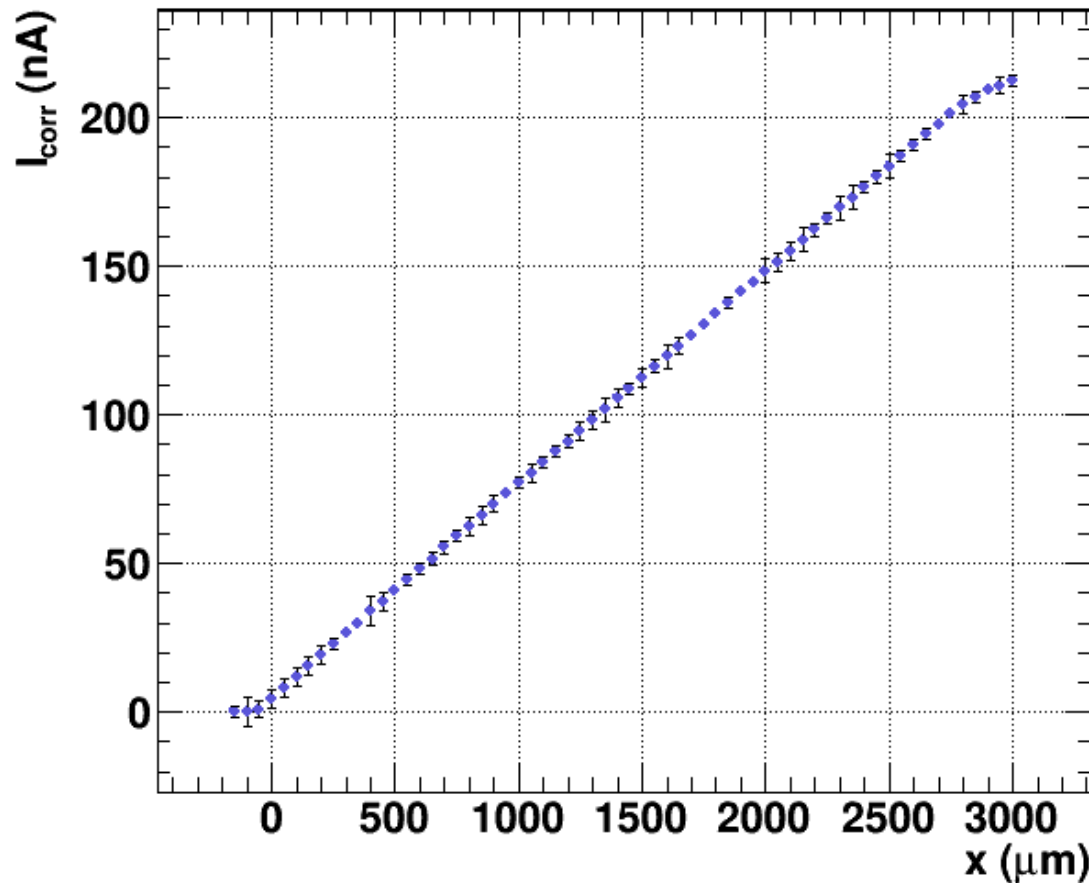
Tg lamp emission spectrum comparison (normalized):



Spectra measurements with PMT and ICMOL's spectrometer are compatible
Results also agree with McPherson

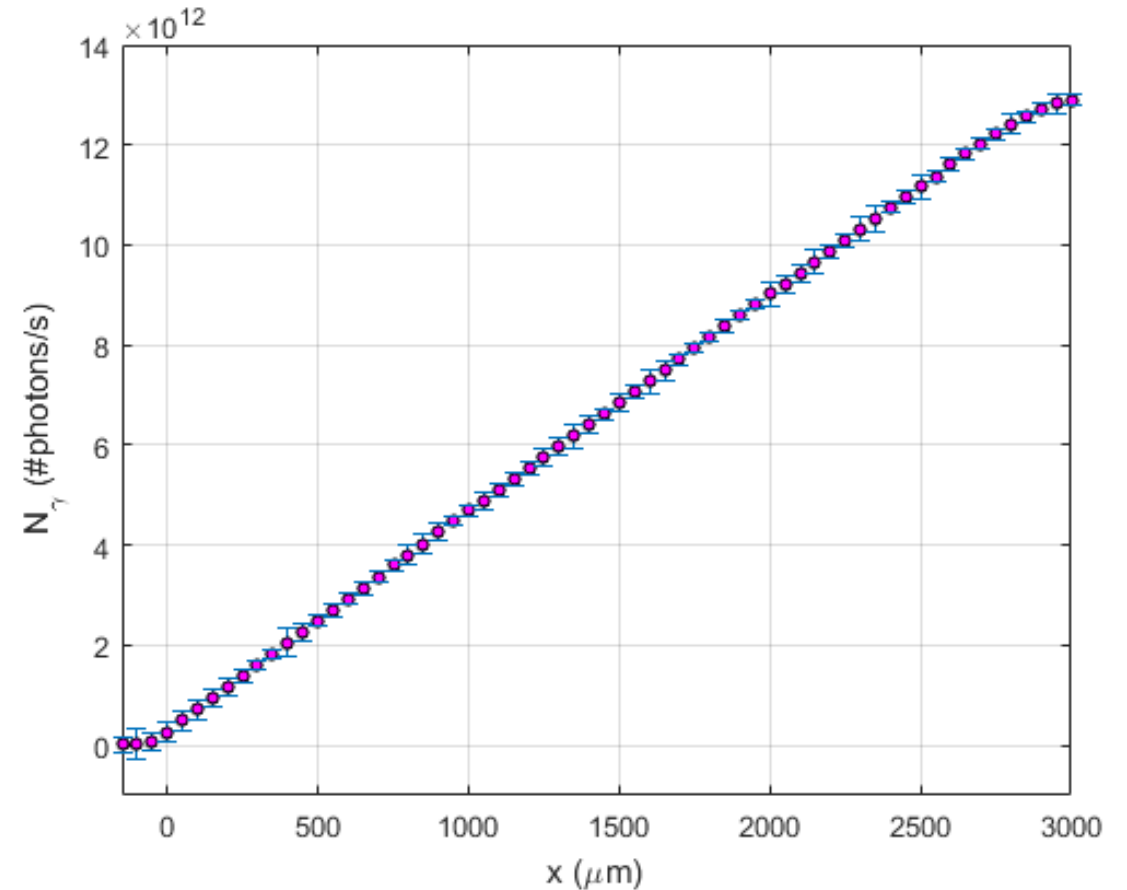
$$\frac{N_{\gamma}}{R} \approx 7 \times 10^6$$

Light output as a function of exit slit opening



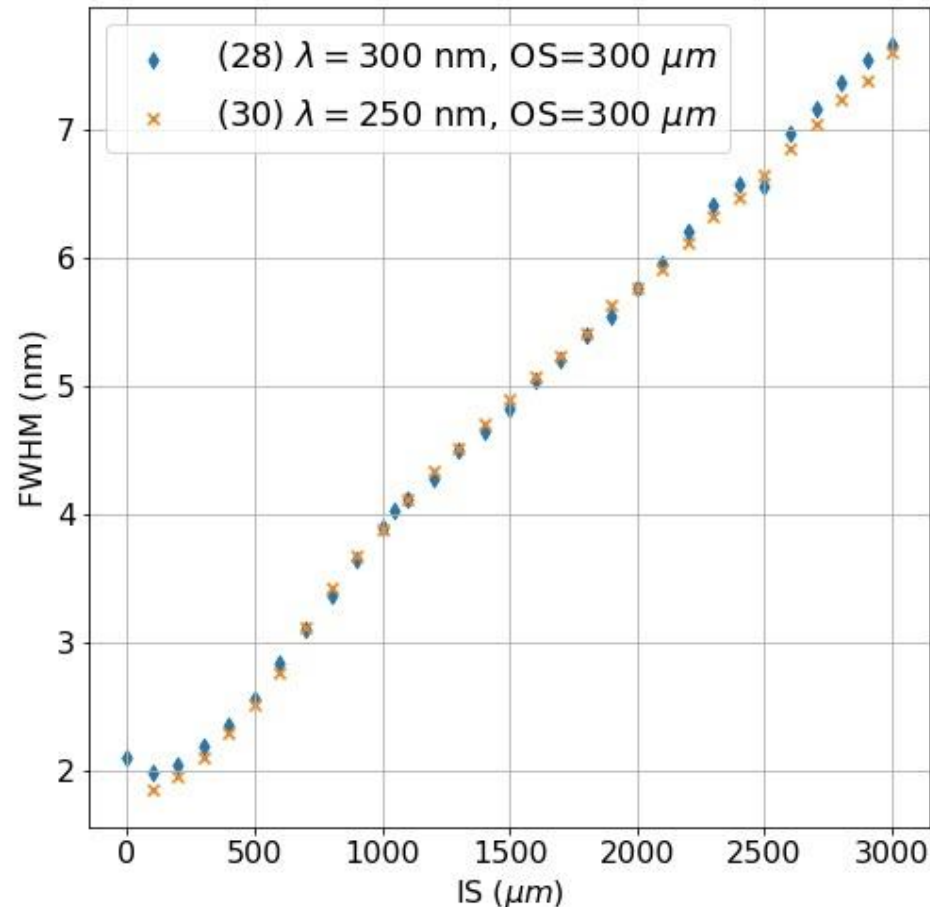
*Errors are multiplied by 100

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



Output Intensity versus OS
opening is **linear**:
**measurements of number of
photons are reliable**

Peak width variations with IS and OS (Julio's plot):



FWHM increases with IS (i.e. less resolution –max[FWHM] = 8nm-), and less significantly with OS, but it doesn't depend on λ

Variations of the FWHM with IS for two different wavelengths.

Output slit : 0.3 mm

Next tasks:

- **Tg lamp stability and measurements reproducibility**
- **Determination of the systematic error of the measurements**