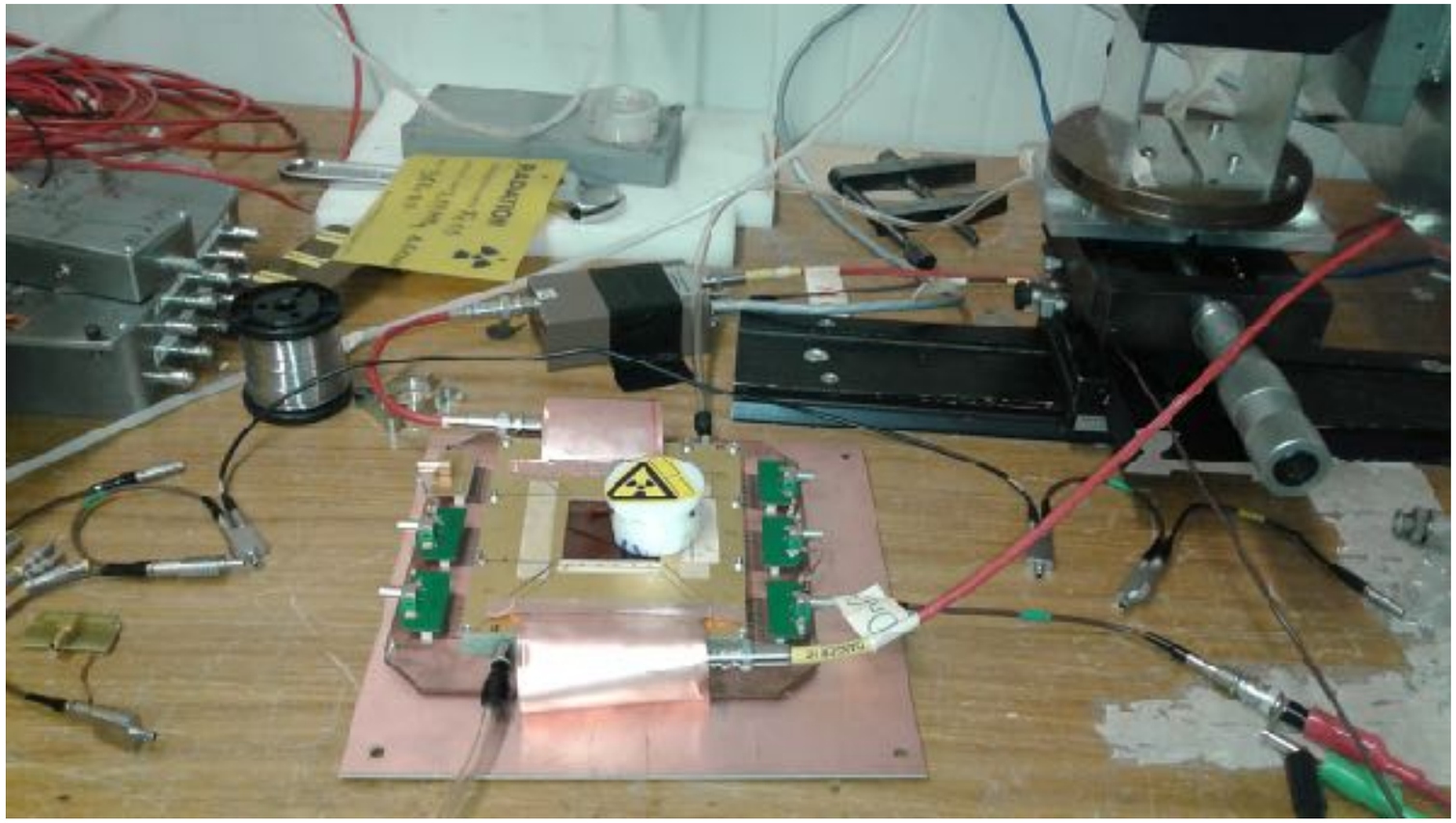
Test Beam Cern February 2017

Eleonora Rossi

Measurements with ^{55}Fe Sources

Weak Iron-55 Source (Activity~300 kBq) + **Strong Iron-55 Source** (Activity~160MBq).
Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V).
MESH signal read by a **preamplifier** which has an input impedance of **100 MOhm**.

- **MESH current** read by Power Supply I_mon (Offset -0,3 nA).
- **Rate measurements** through MESH signal (discriminator+scaler).
- **Pad current measurements** through picoammeter.



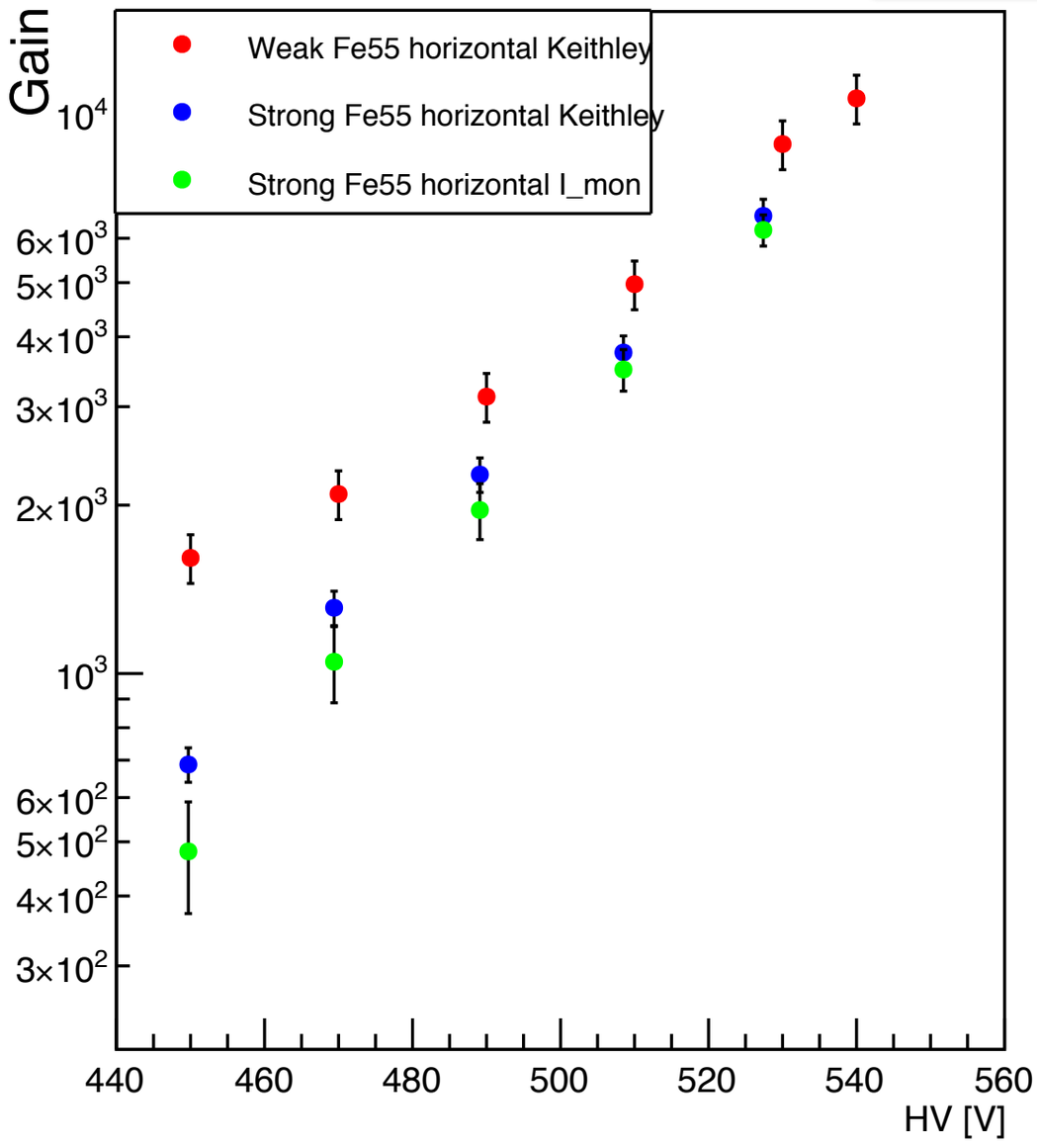
Paddy in a horizontal position

Paddy in an vertical position

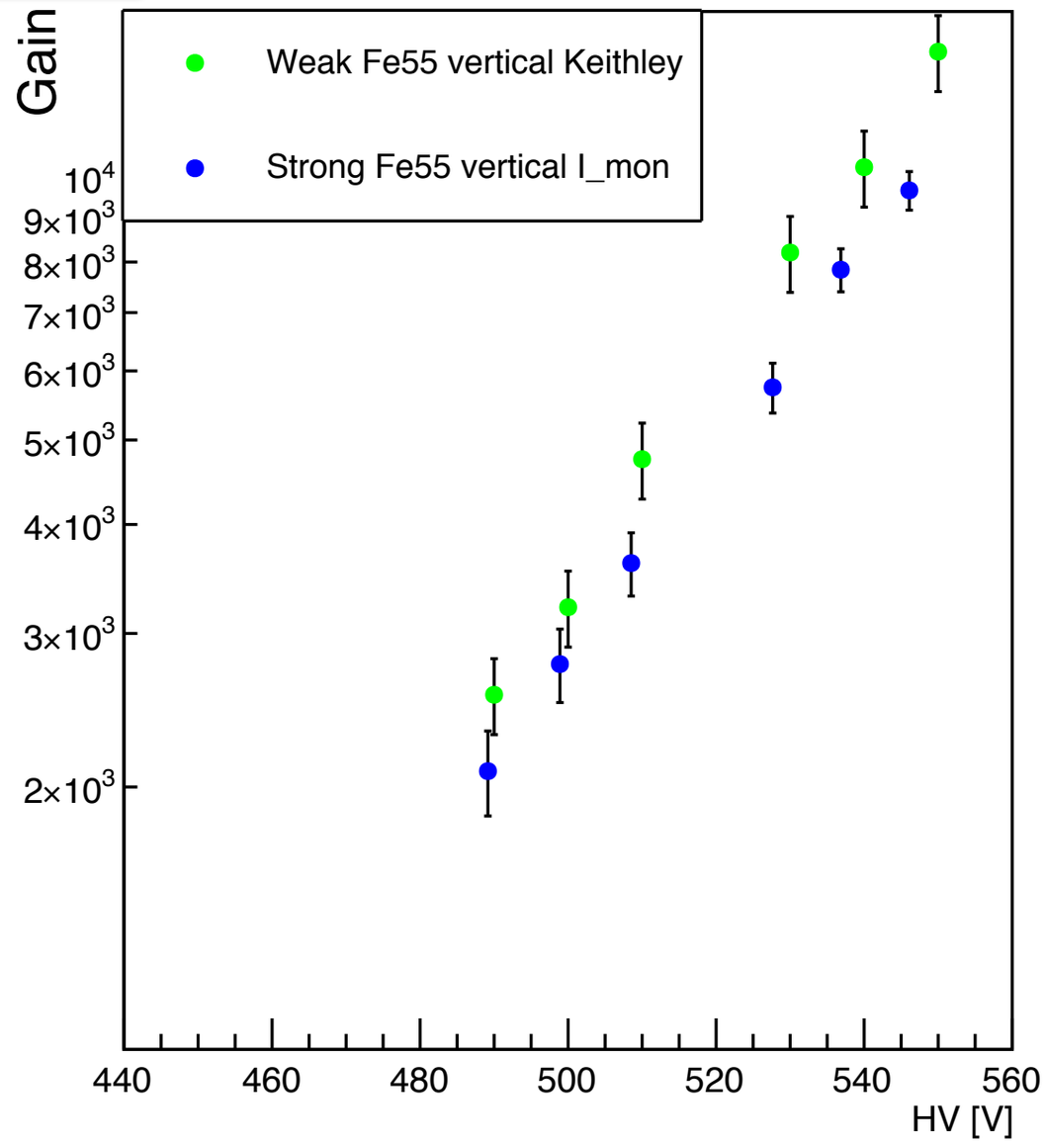
Measurements with ^{55}Fe Sources

$$G = \frac{I}{n_p e R}$$

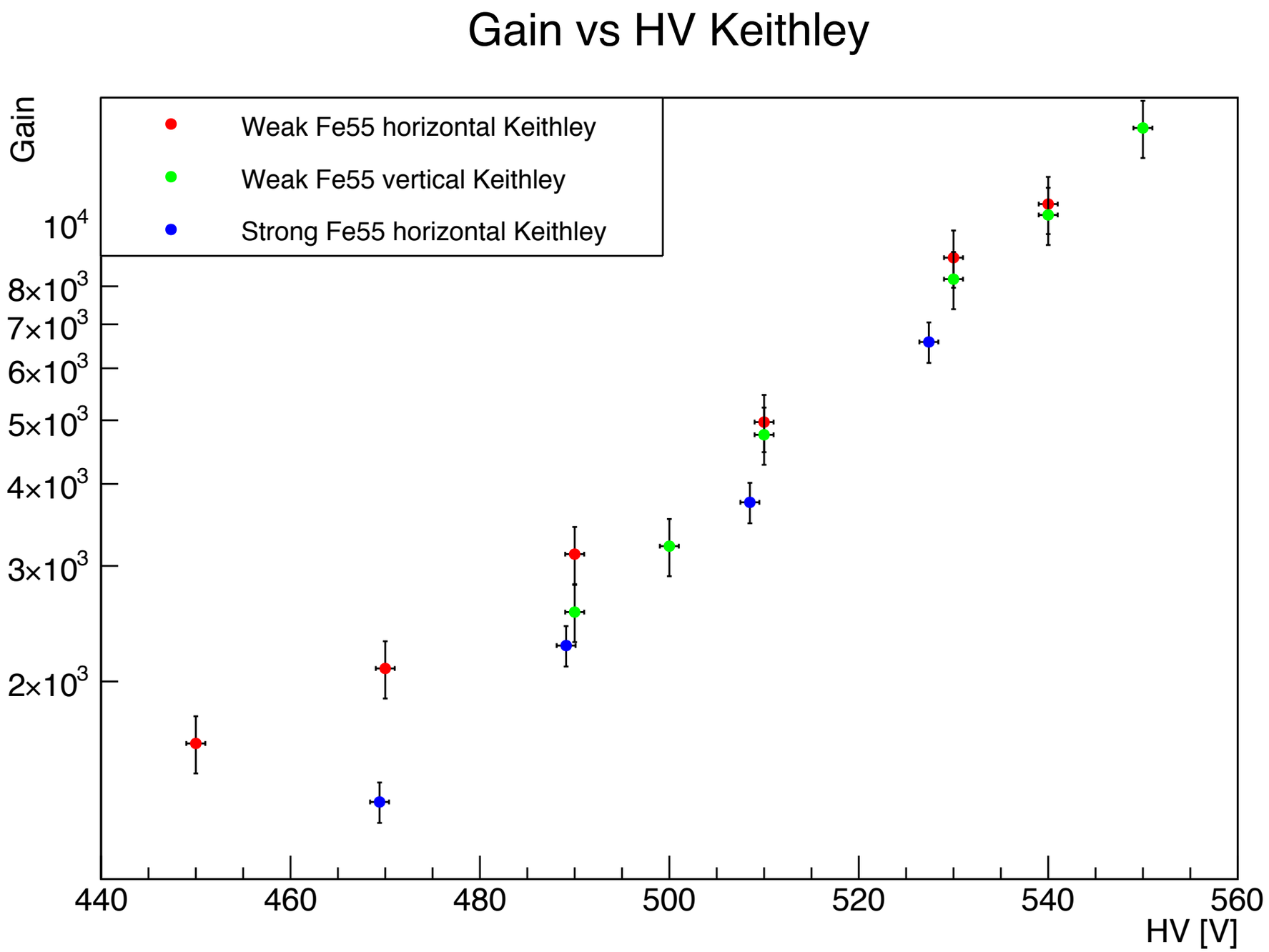
Gain vs HV horizontal



Gain vs HV vertical

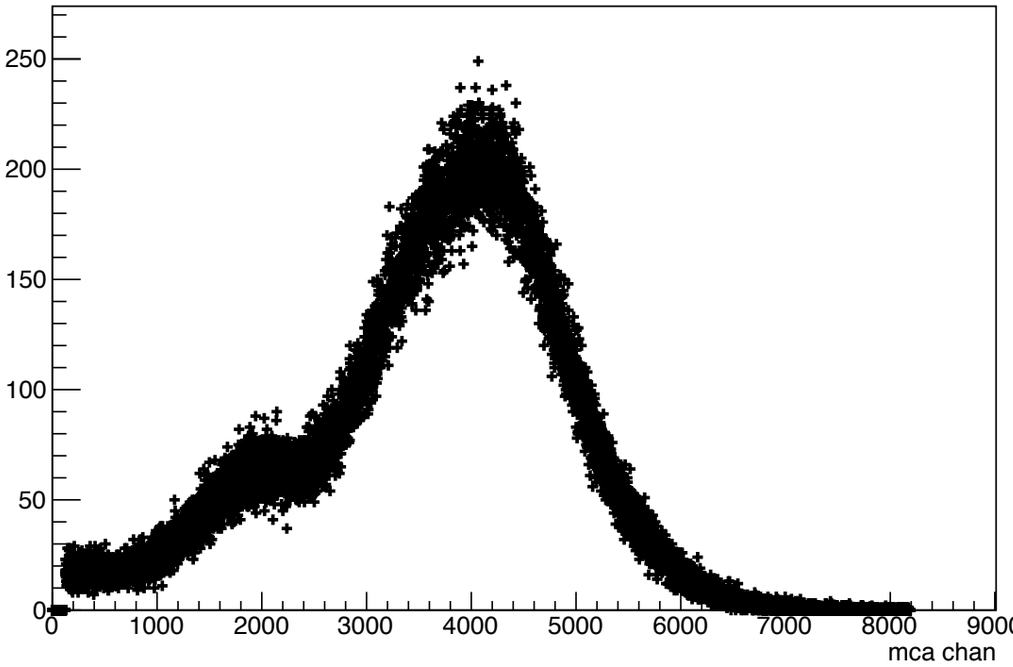


Measurements with ^{55}Fe Sources

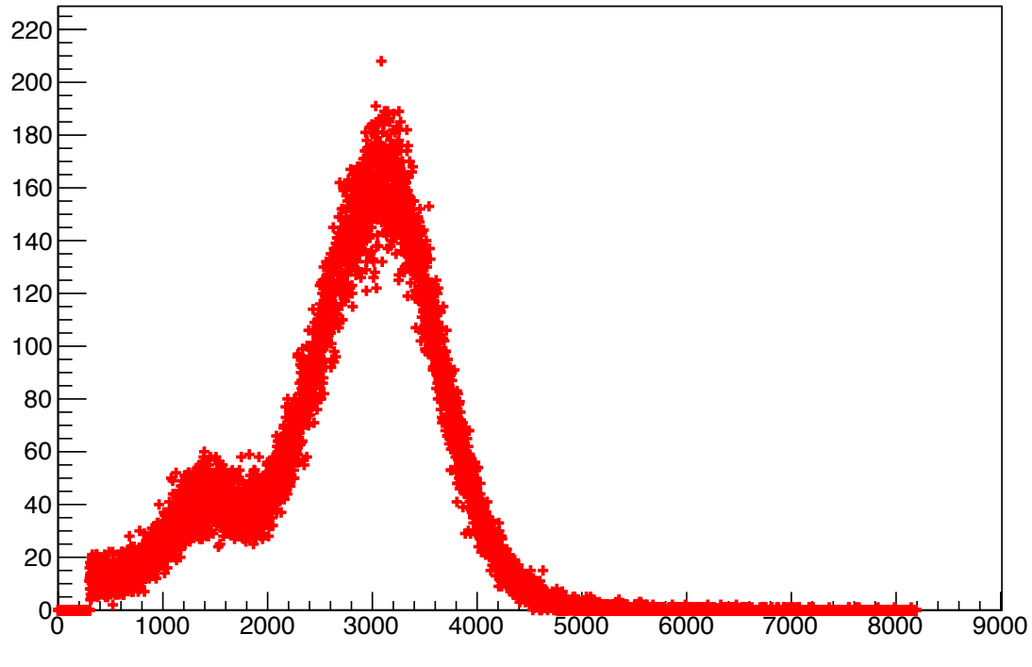


Measurements with ^{55}Fe Sources

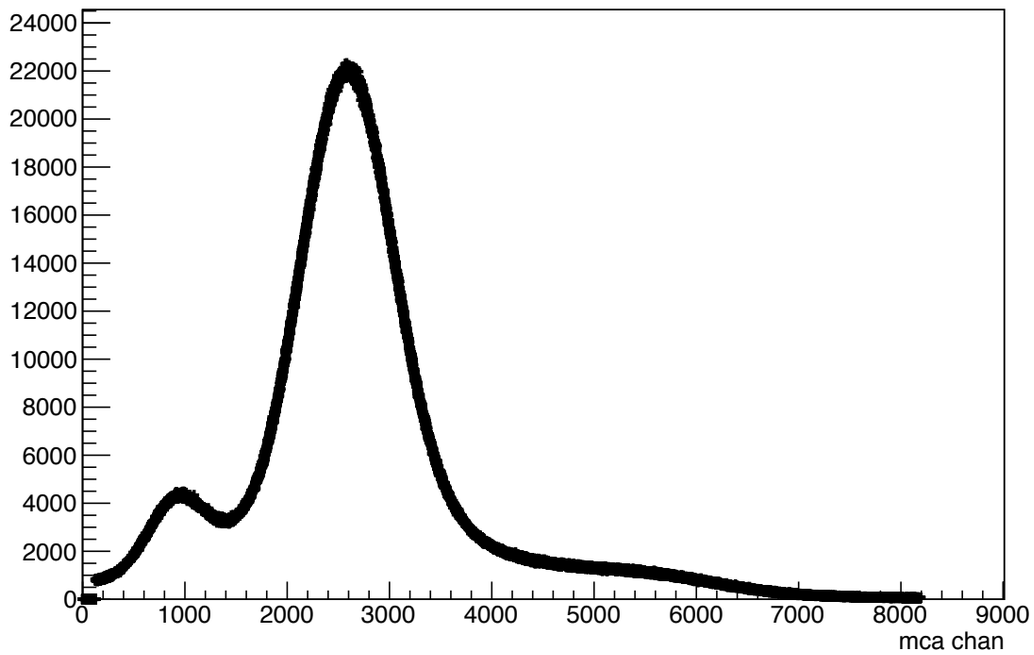
Horizontal Weak 55Fe HV=540-740 V



Vertical Weak 55Fe HV=500-700 V



Horizontal Strong 55Fe HV=530-730 V



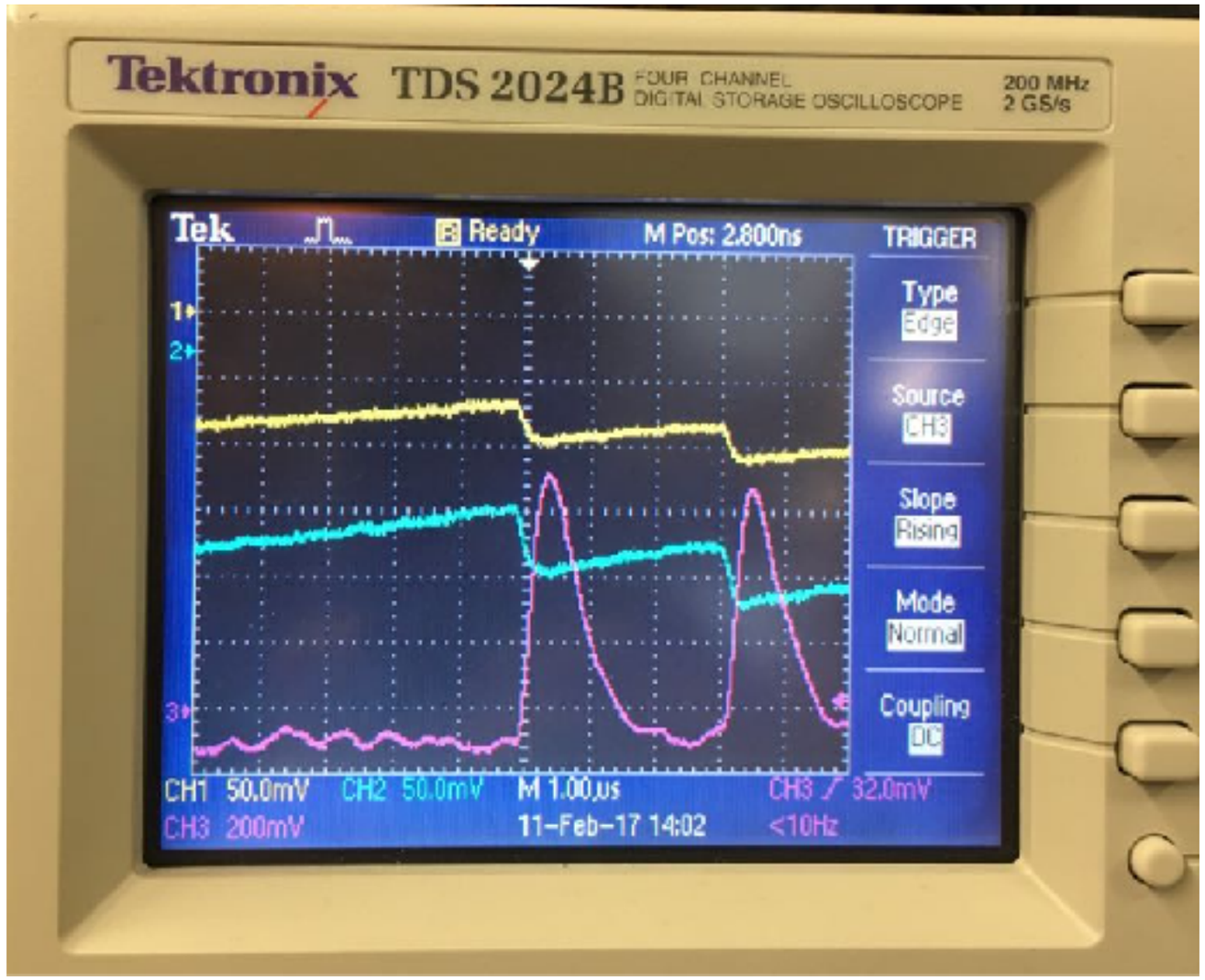
Measurements with X-rays Source

Data taken using a 1 mm² collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

$$Rate\,Pile-up\,probability = (1 - e^{\lambda}) \qquad \lambda = Rate_{true}\Delta t \qquad \Delta t = width_{signal} \sim 1\mu s$$

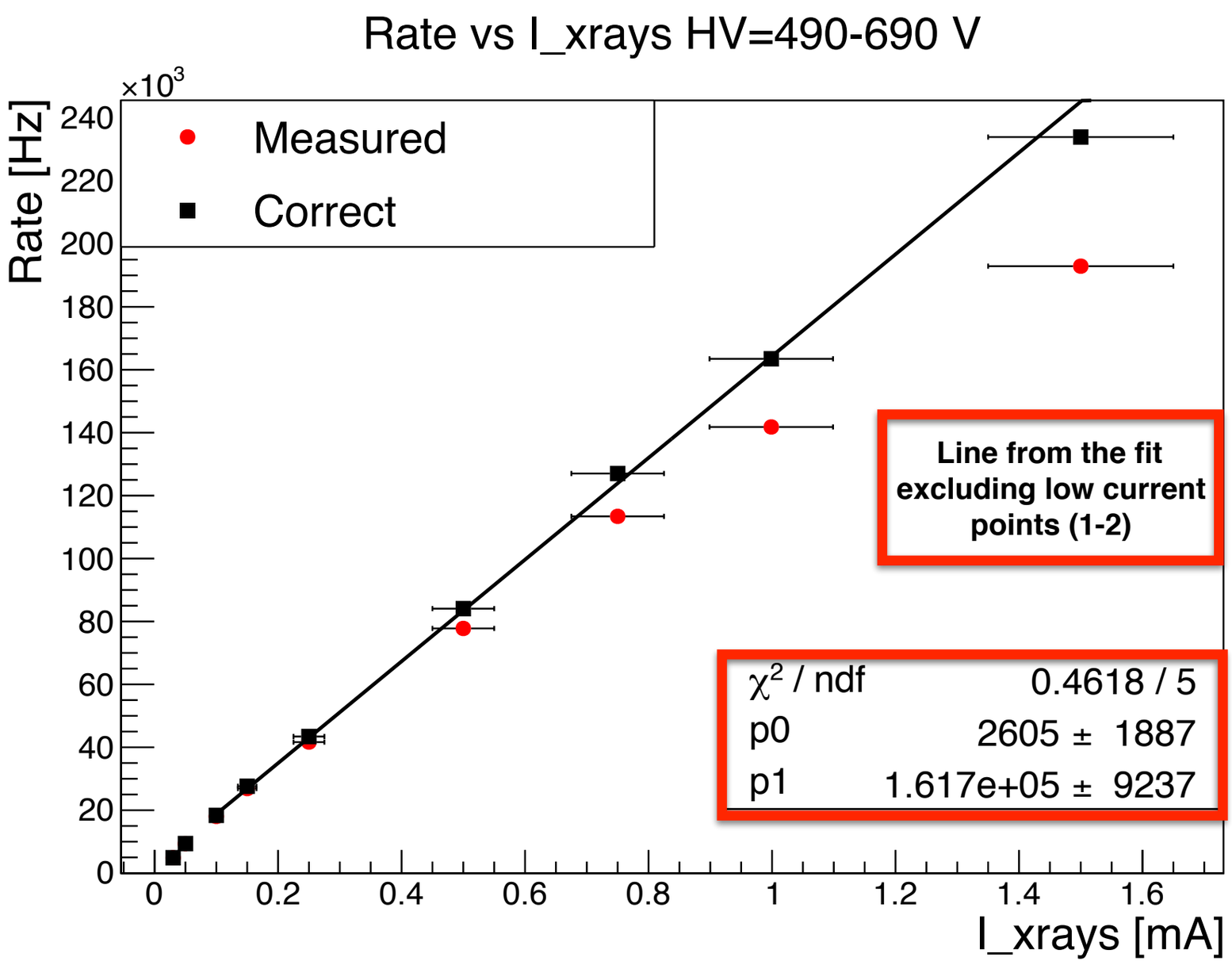


Measurements with X-rays Source

Data taken using a 1 mm^2 collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

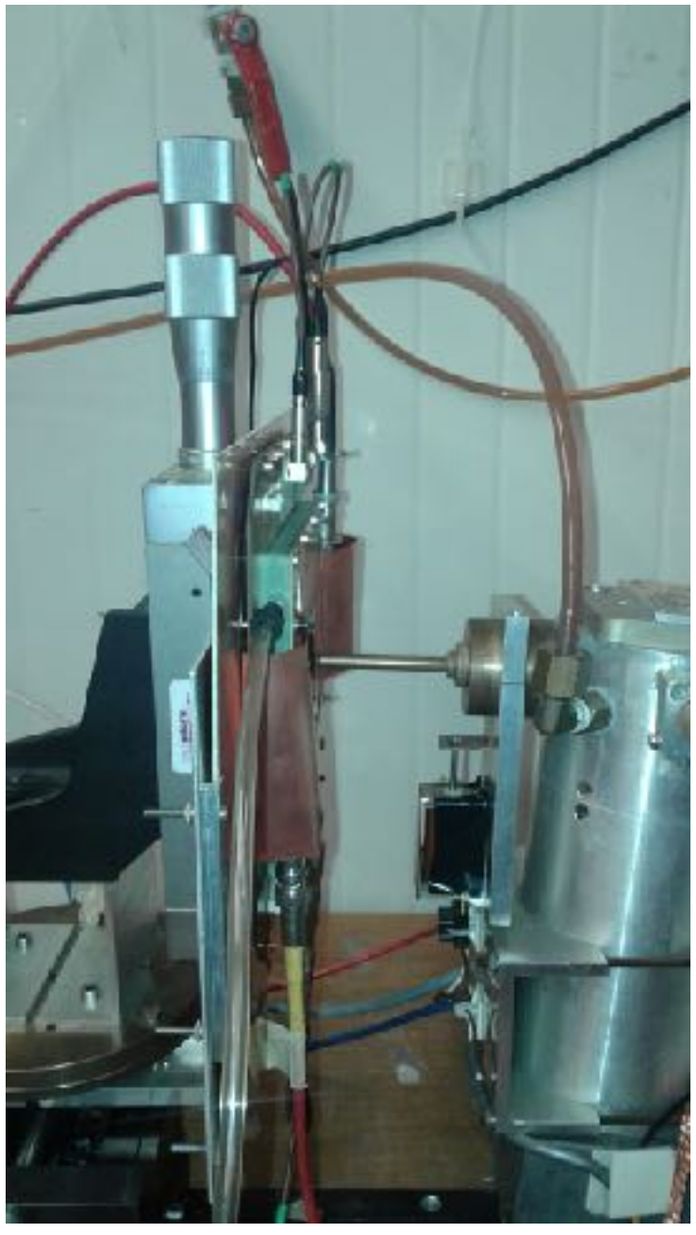


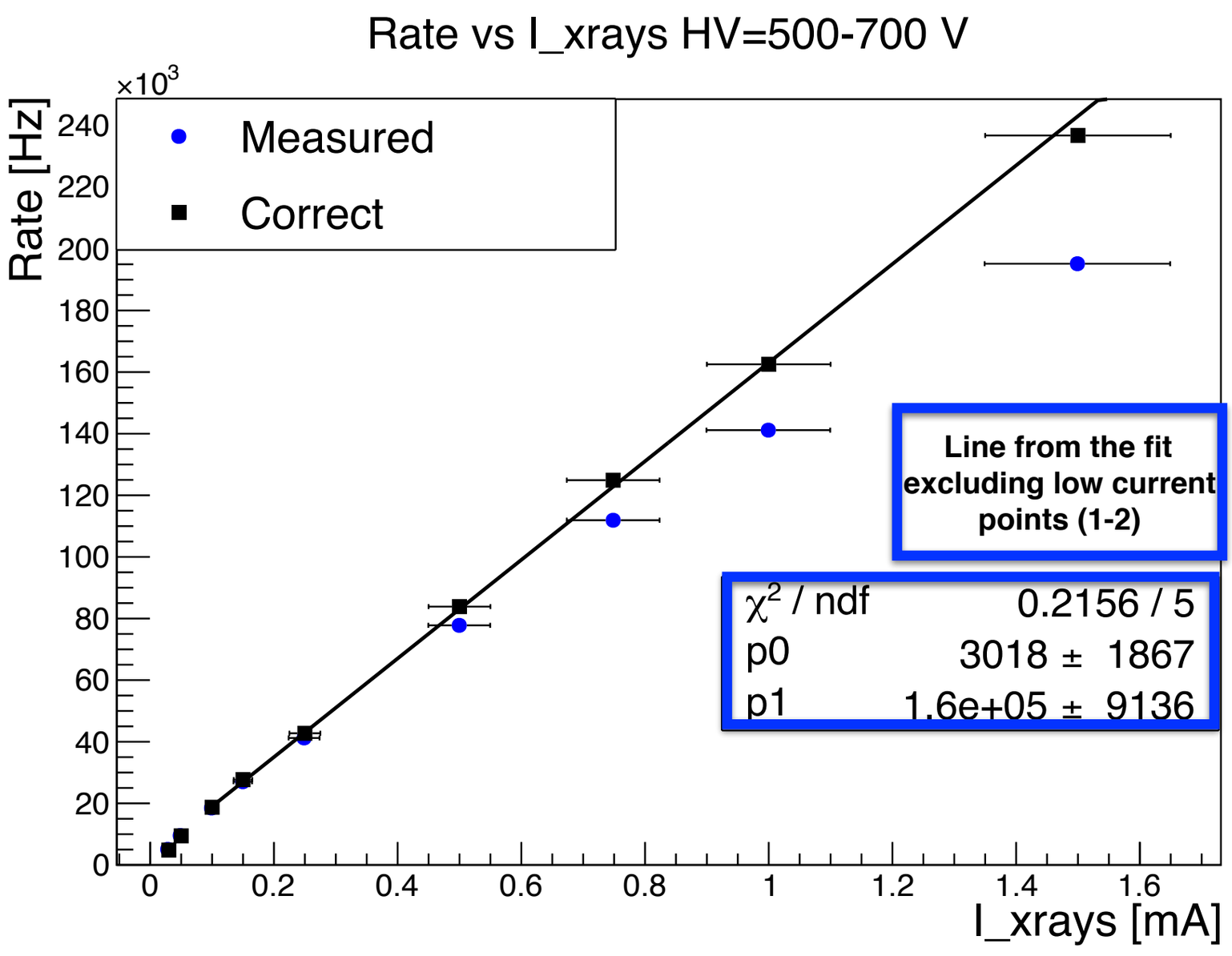
Measurements with X-rays Source

Data taken using a 1 mm^2 collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED



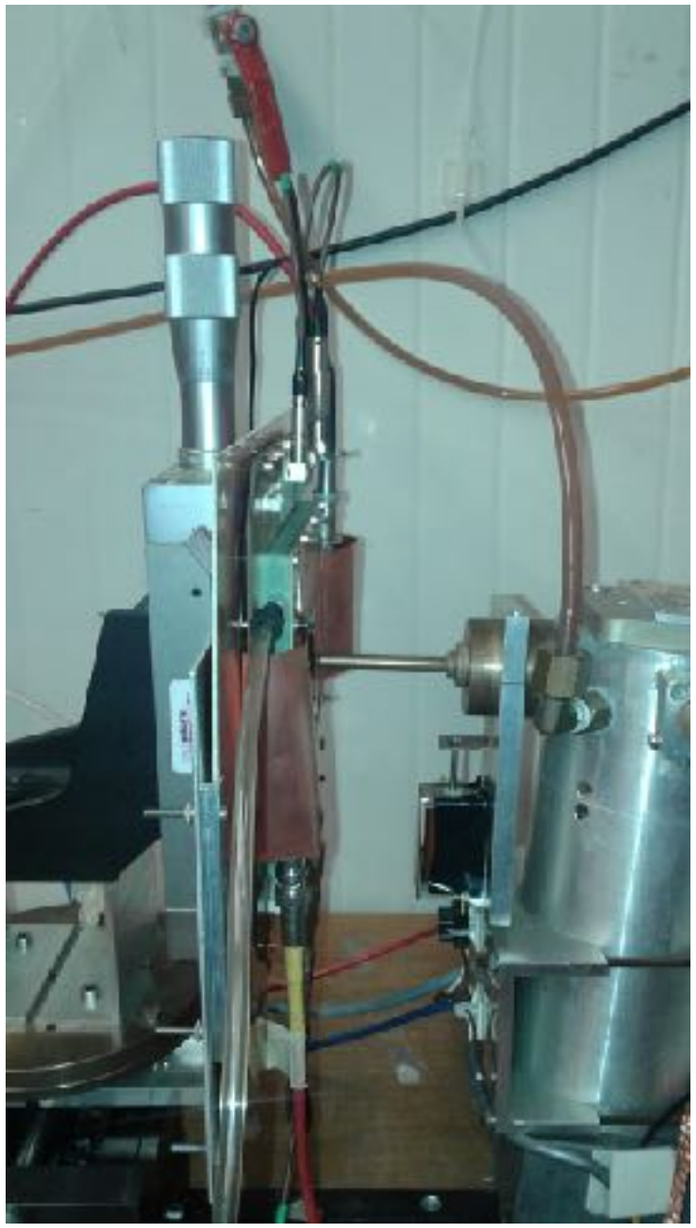


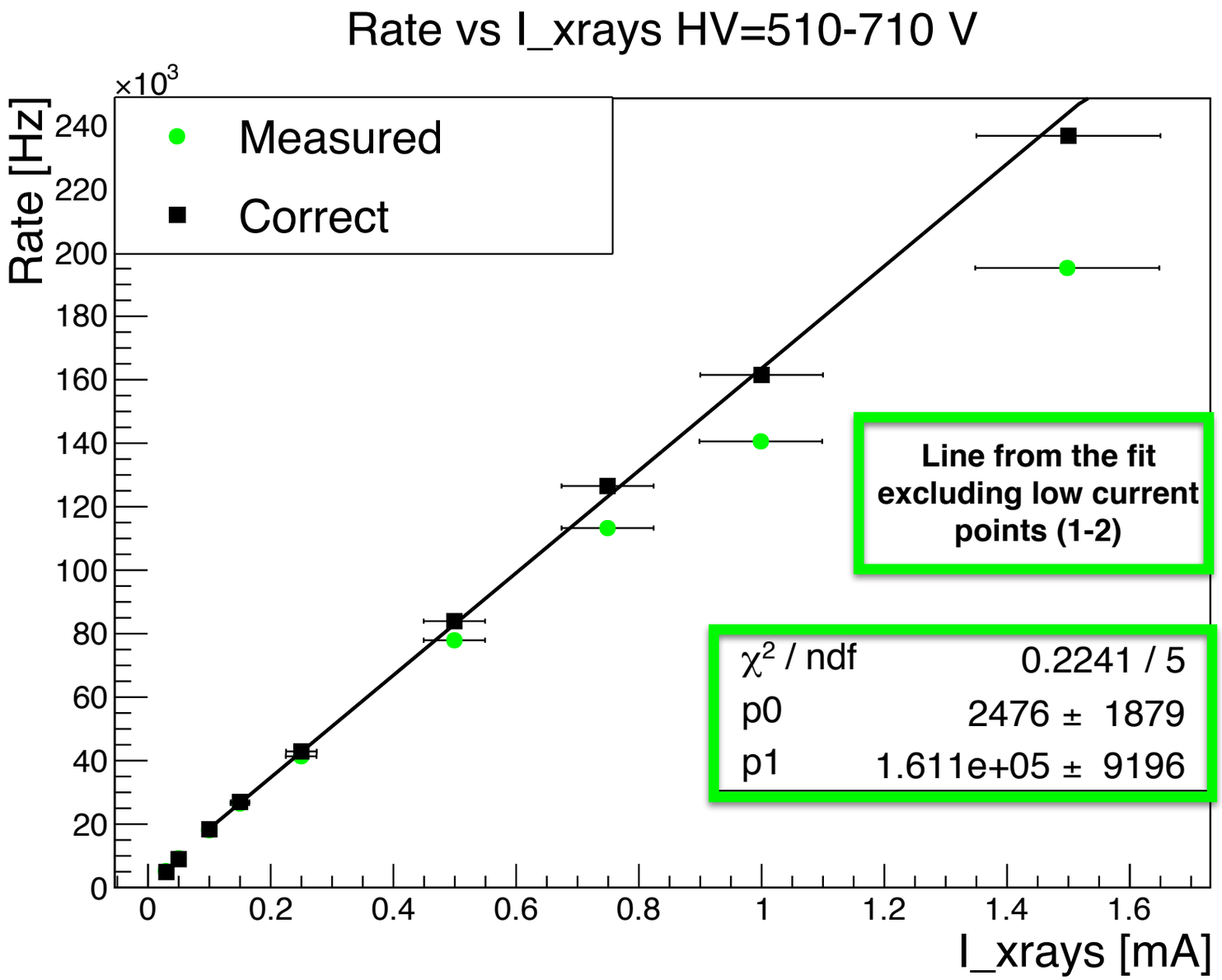
Measurements with X-rays Source

Data taken using a 1 mm^2 collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED



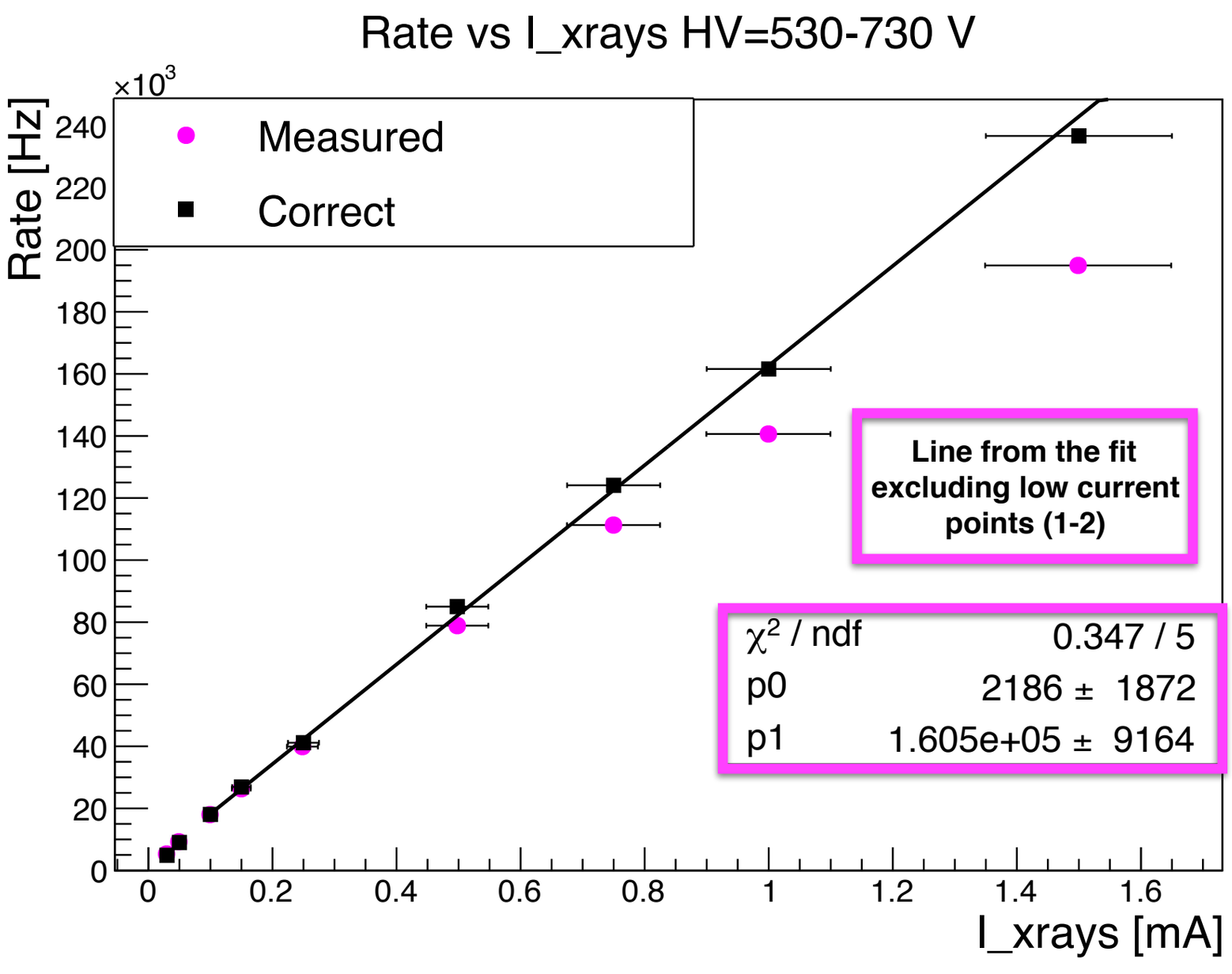


Measurements with X-rays Source

Data taken using a 1 mm^2 collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

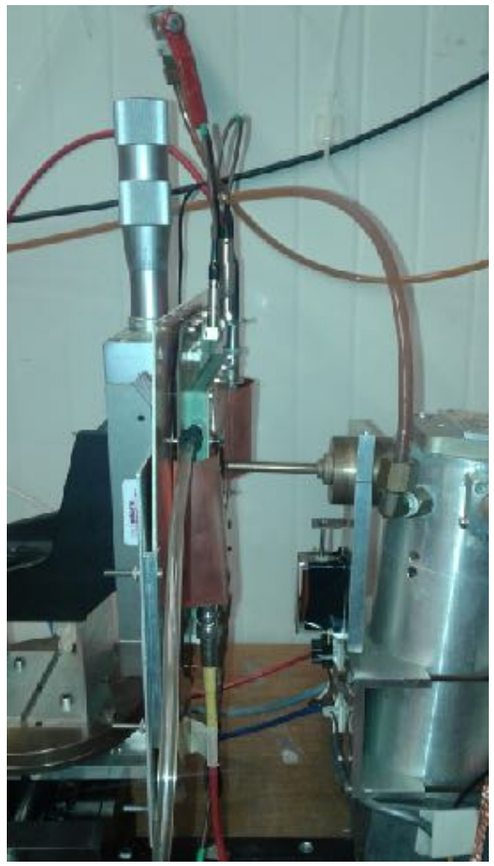


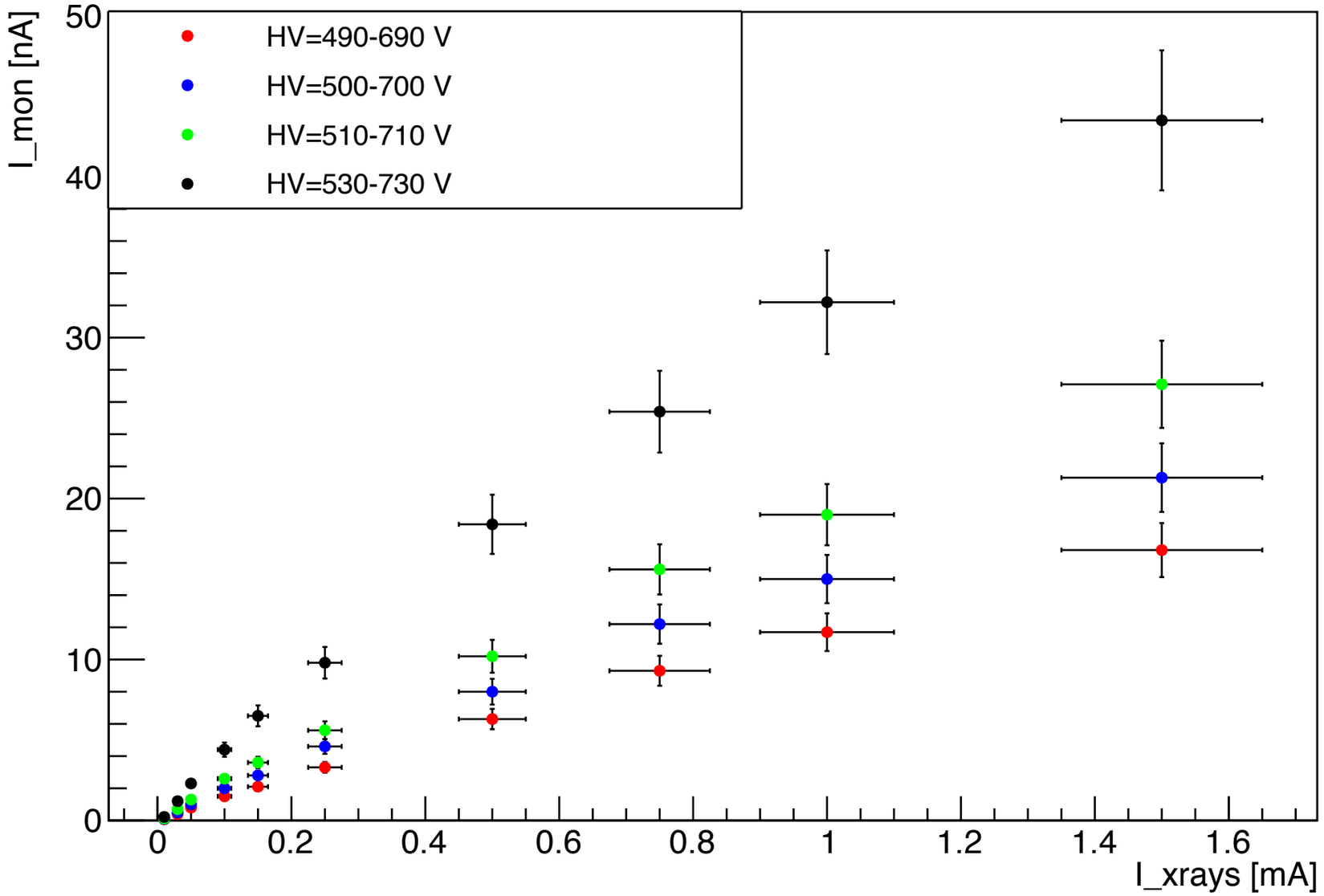
Measurements with X-rays Source

Data taken using a 1 mm^2 collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED





Measurements with X-rays Source

Data taken using a 1 mm² collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

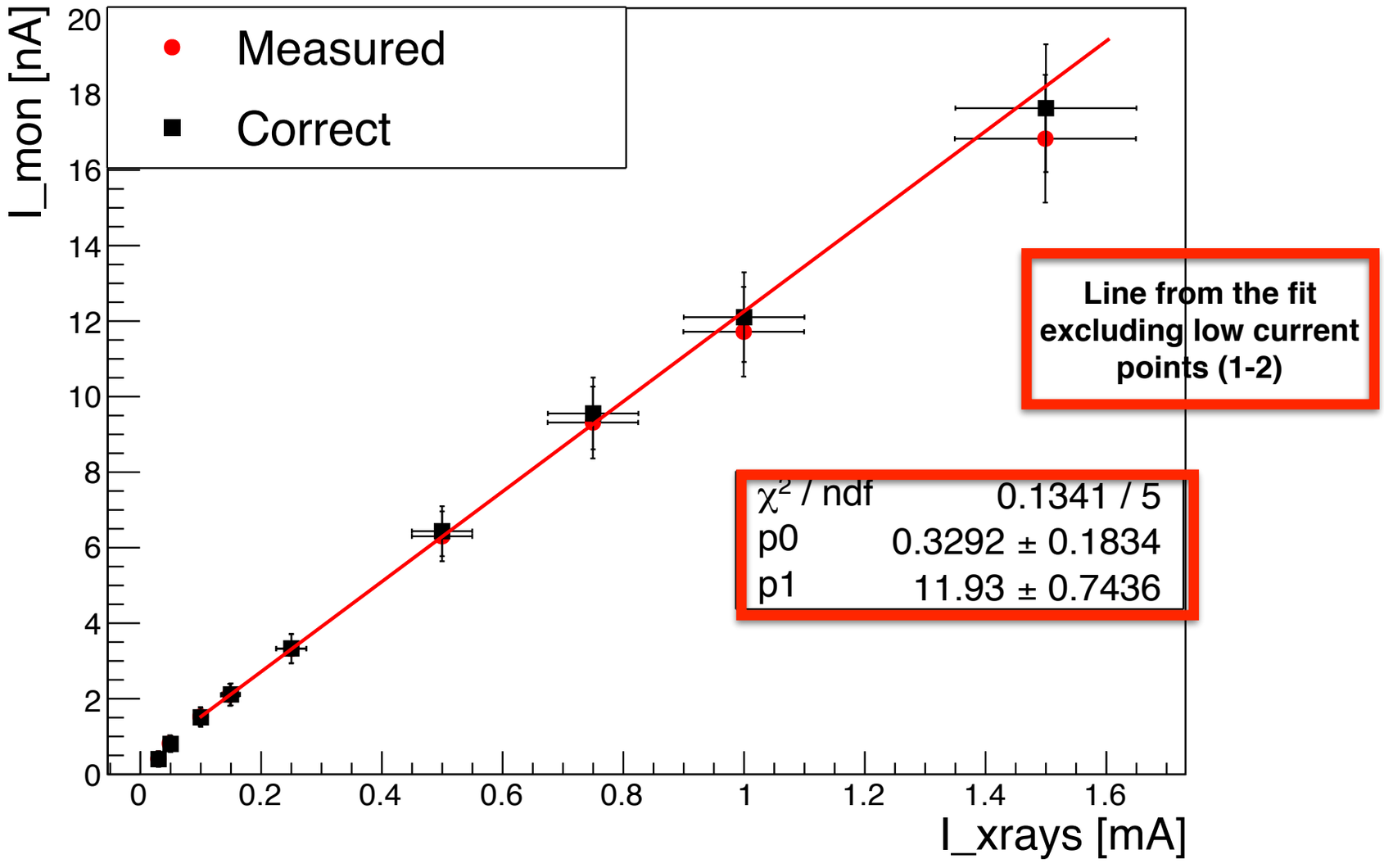
PREAMPLIFIER USED

$$I_{mon}^{corr} = I_{mon} * \frac{G(490V)}{G(490V - V_{drop})}$$

$$G(V) = e^{-6.038+0.0029V}$$

$$V_{drop} = I_{mon} \times 100M\Omega$$

I_mon vs I_xrays HV=490-690 V



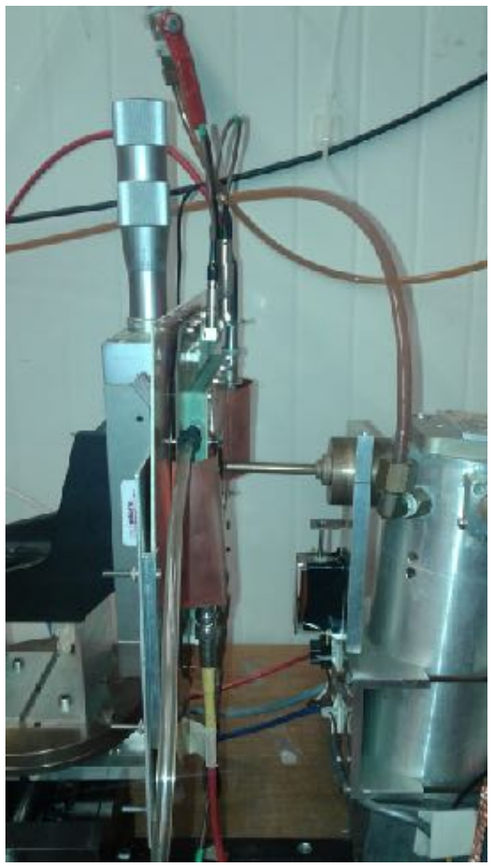
Measurements with X-rays Source

Data taken using a 1 mm² collimator.

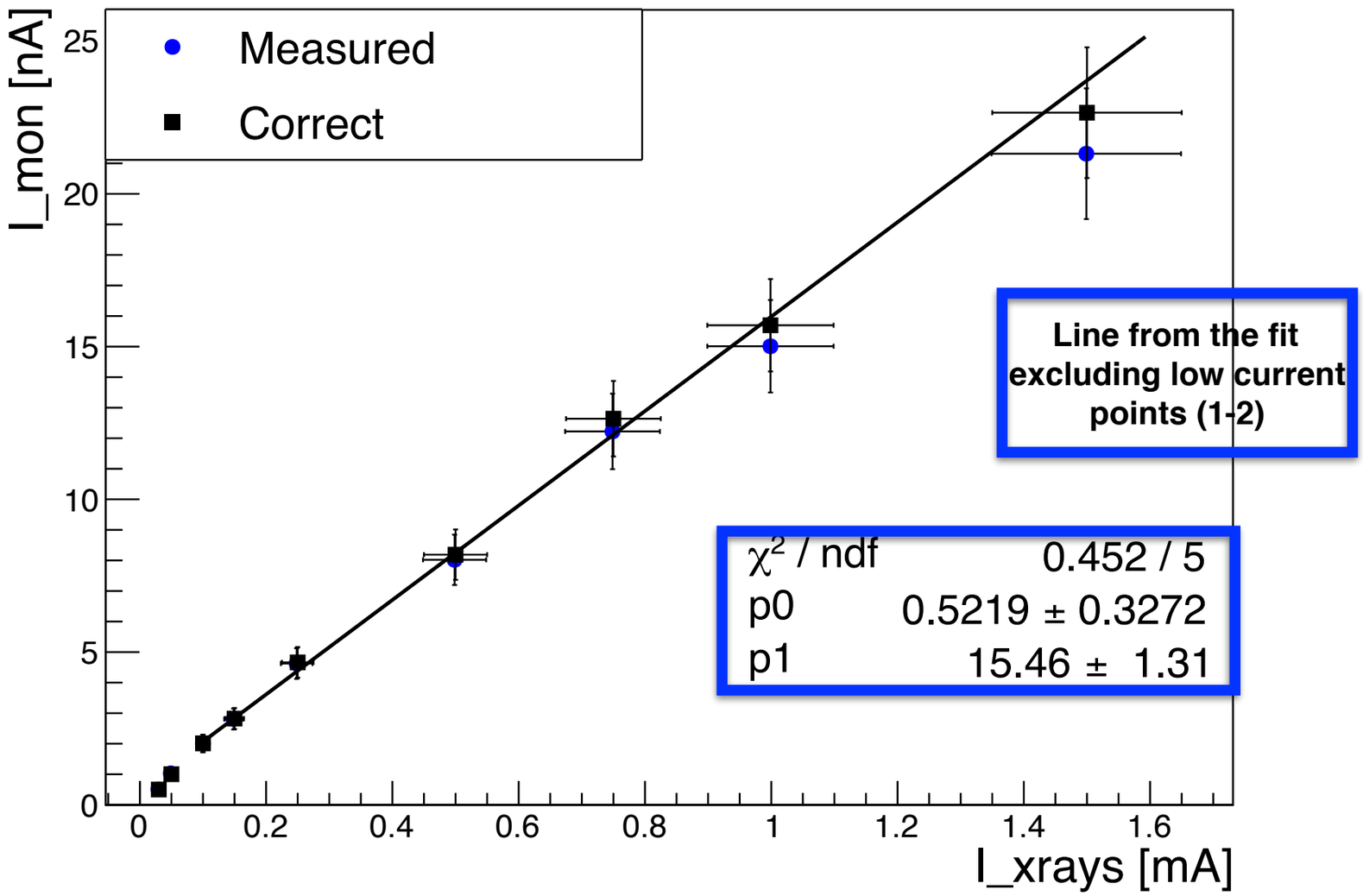
Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

$$I_{mon}^{corr} = I_{mon} * \frac{G(500V)}{G(500V - V_{drop})}$$



I_mon vs I_xrays HV=500-700 V



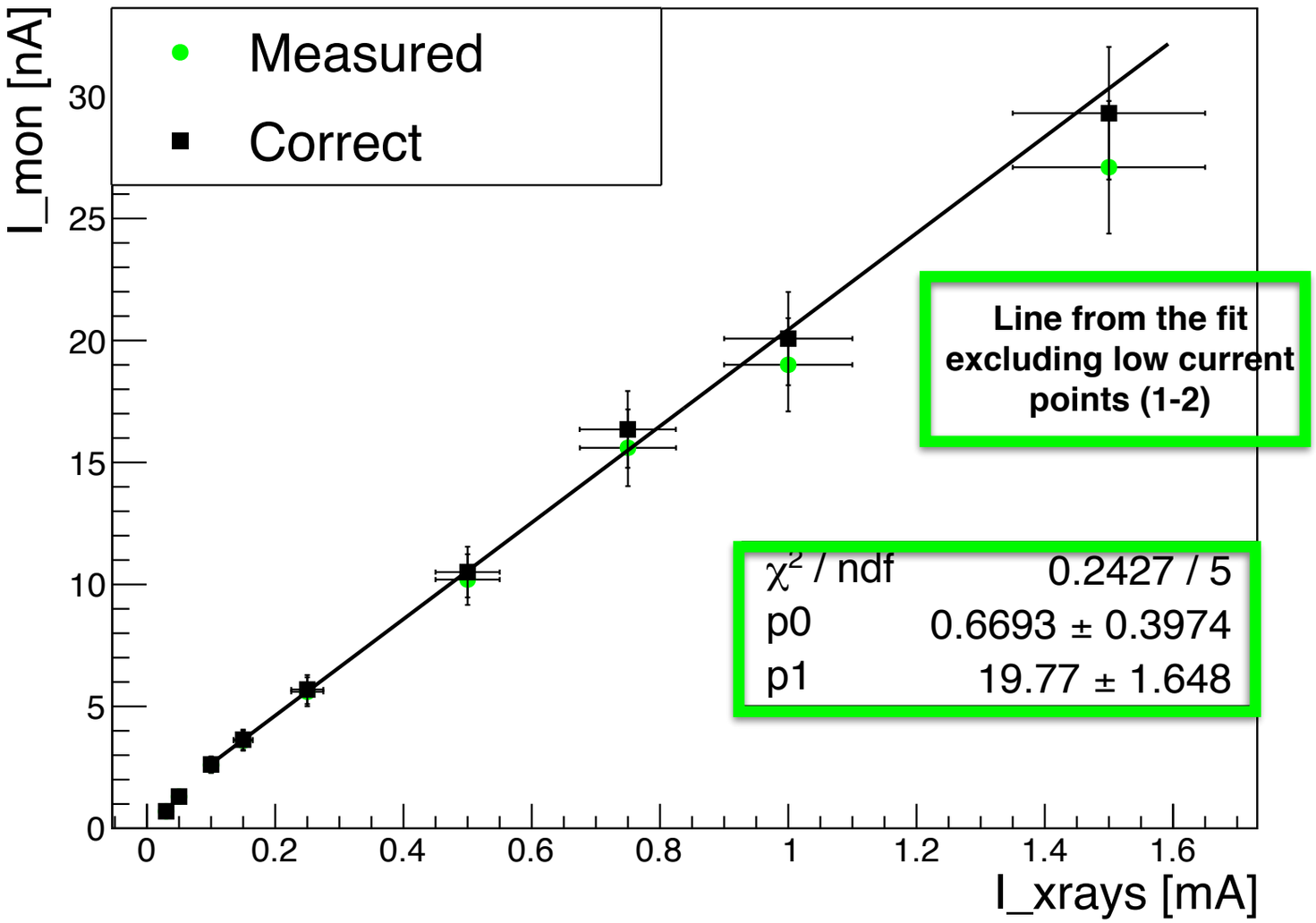
Measurements with X-rays Source

Data taken using a 1 mm² collimator.

Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

$$I_{mon}^{corr} = I_{mon} * \frac{G(510V)}{G(510V - V_{drop})}$$



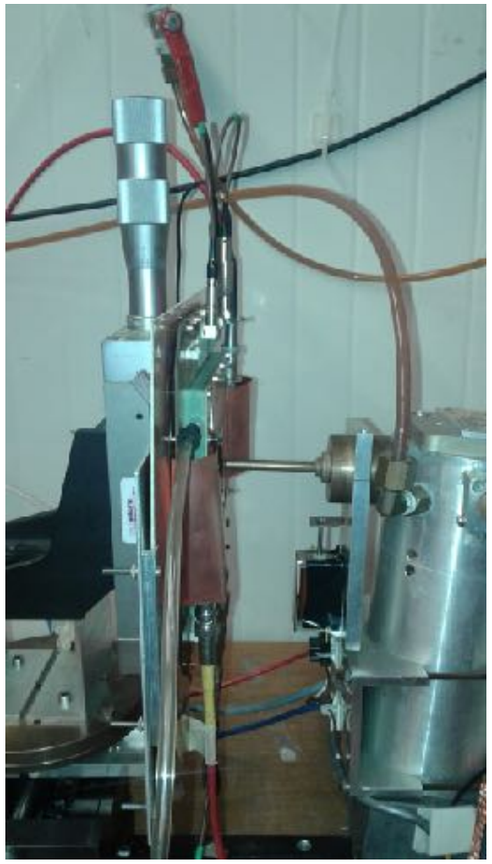
Measurements with X-rays Source

Data taken using a 1 mm² collimator.

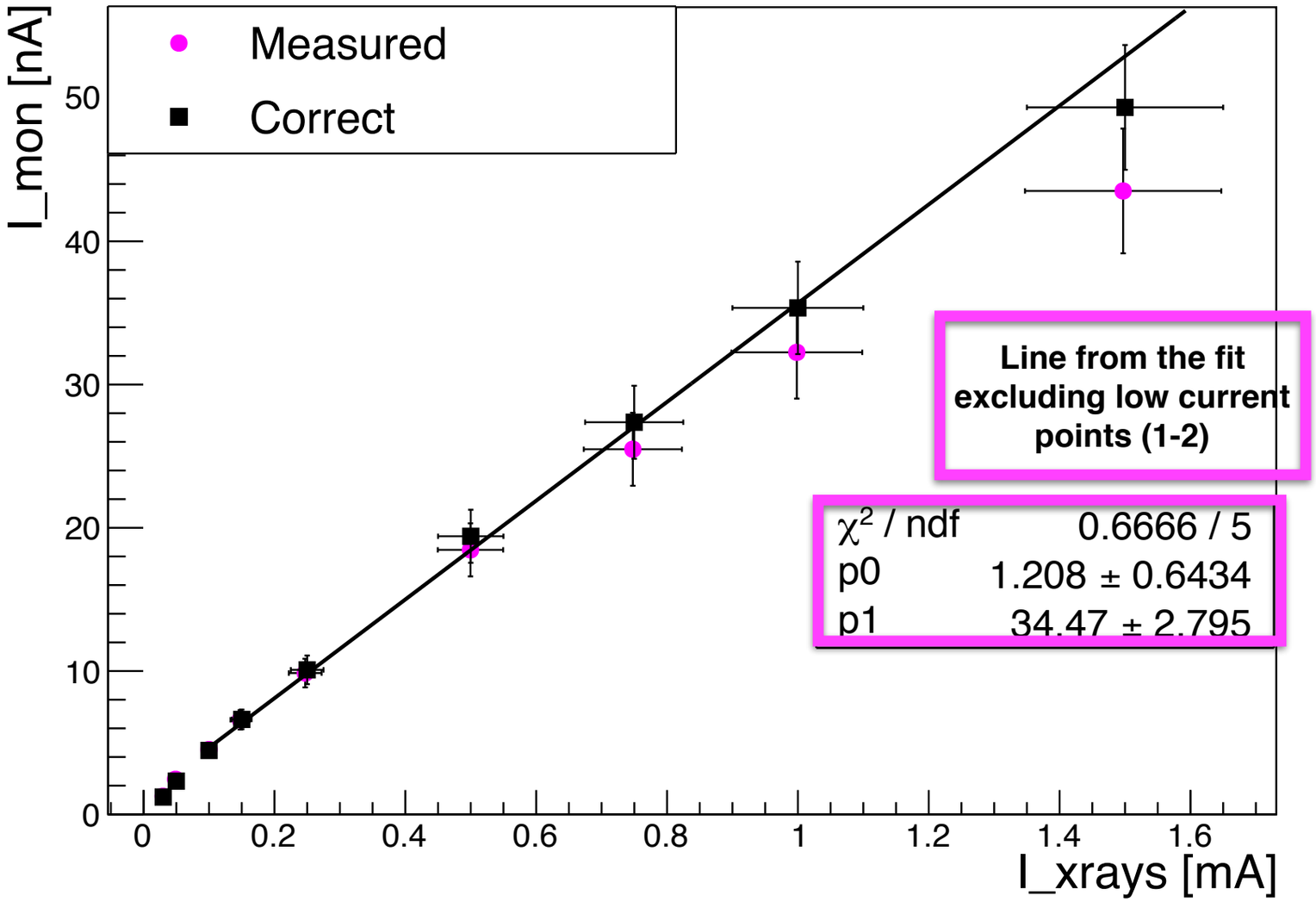
Gain scan as a function of HV applied to the MESH (Vdrift - Vmesh = 200 V) varying the filament current.

PREAMPLIFIER USED

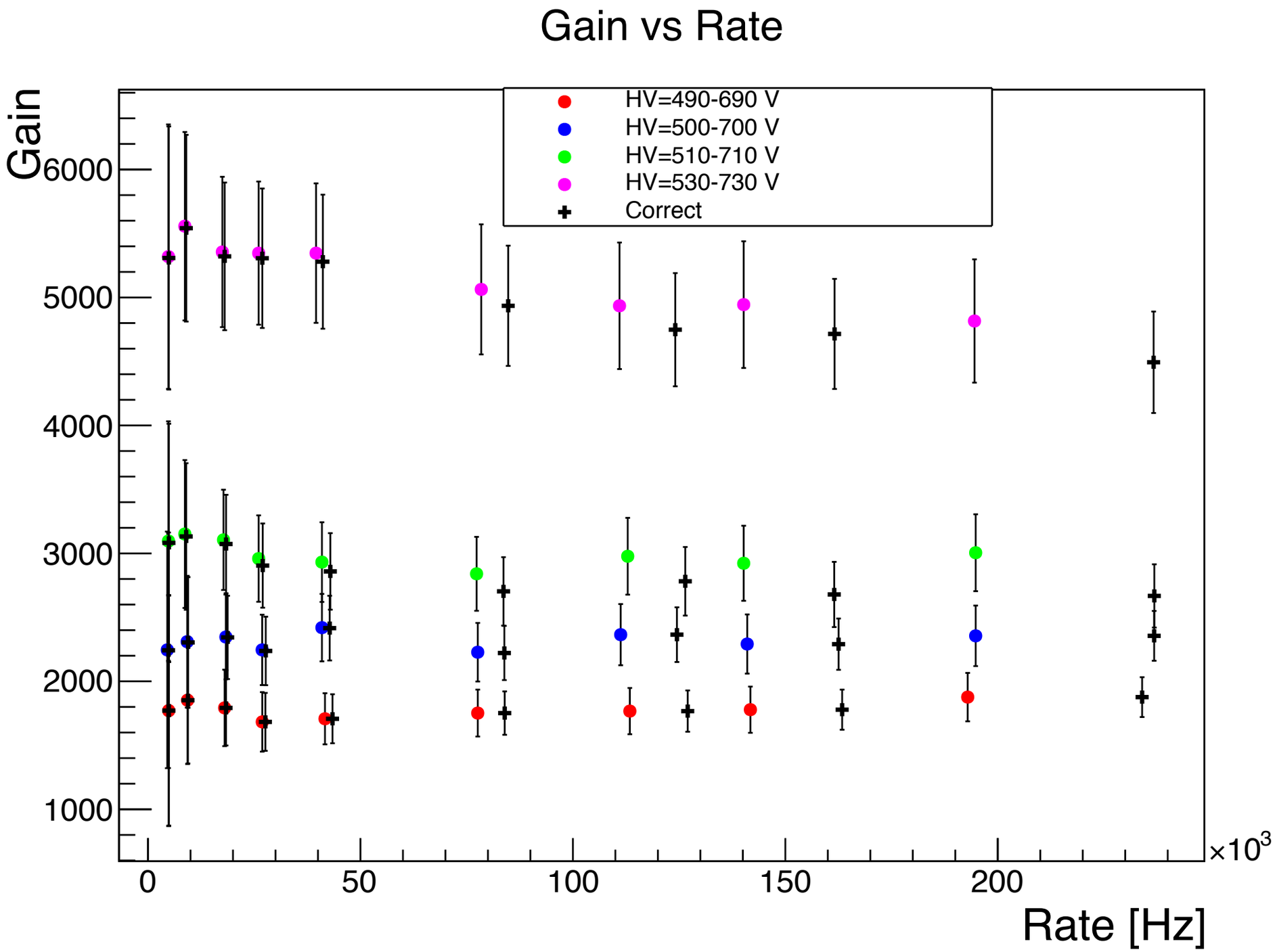
$$I_{mon}^{corr} = I_{mon} * \frac{G(530V)}{G(530V - V_{drop})}$$



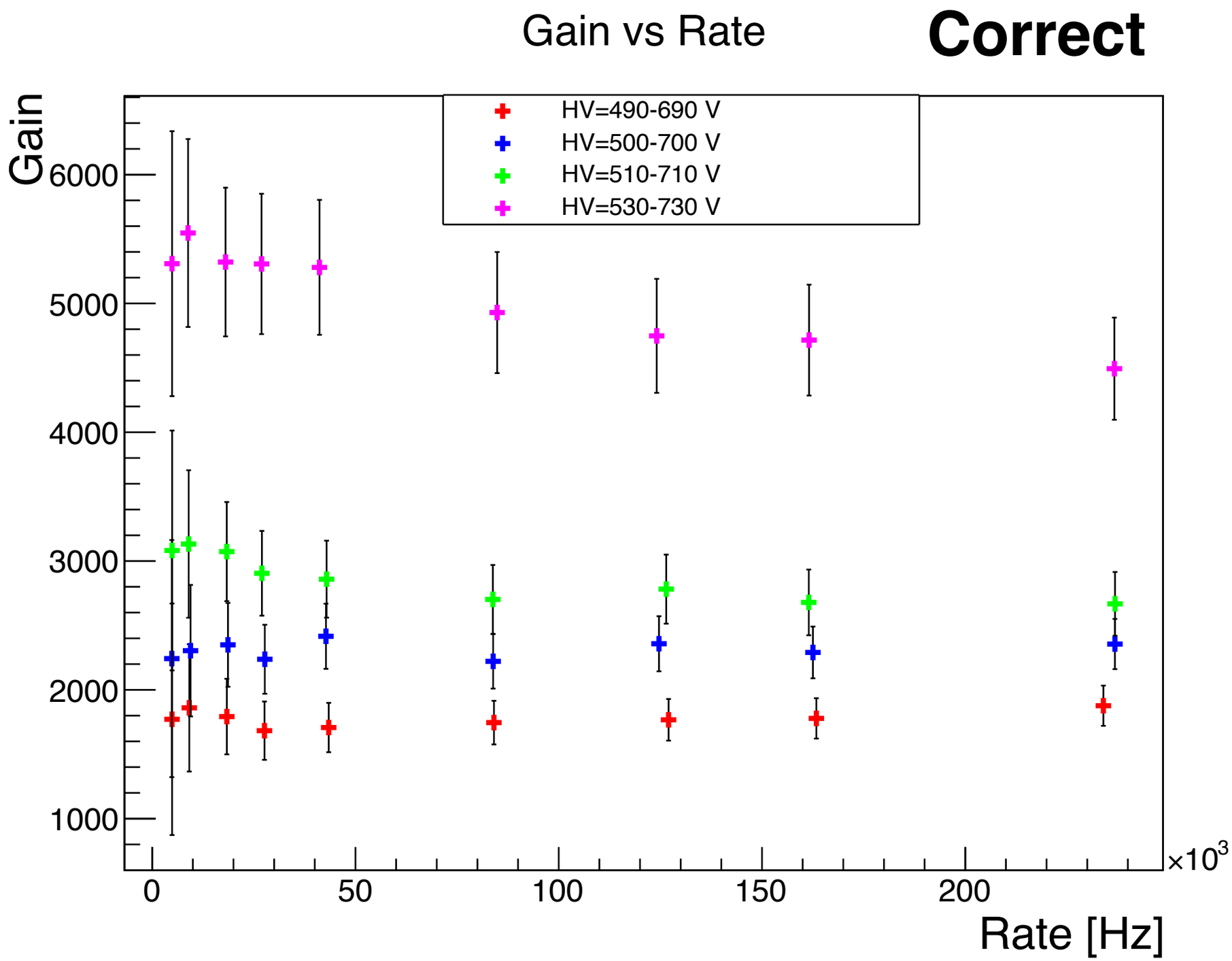
I_mon vs I_xrays HV=530-730 V



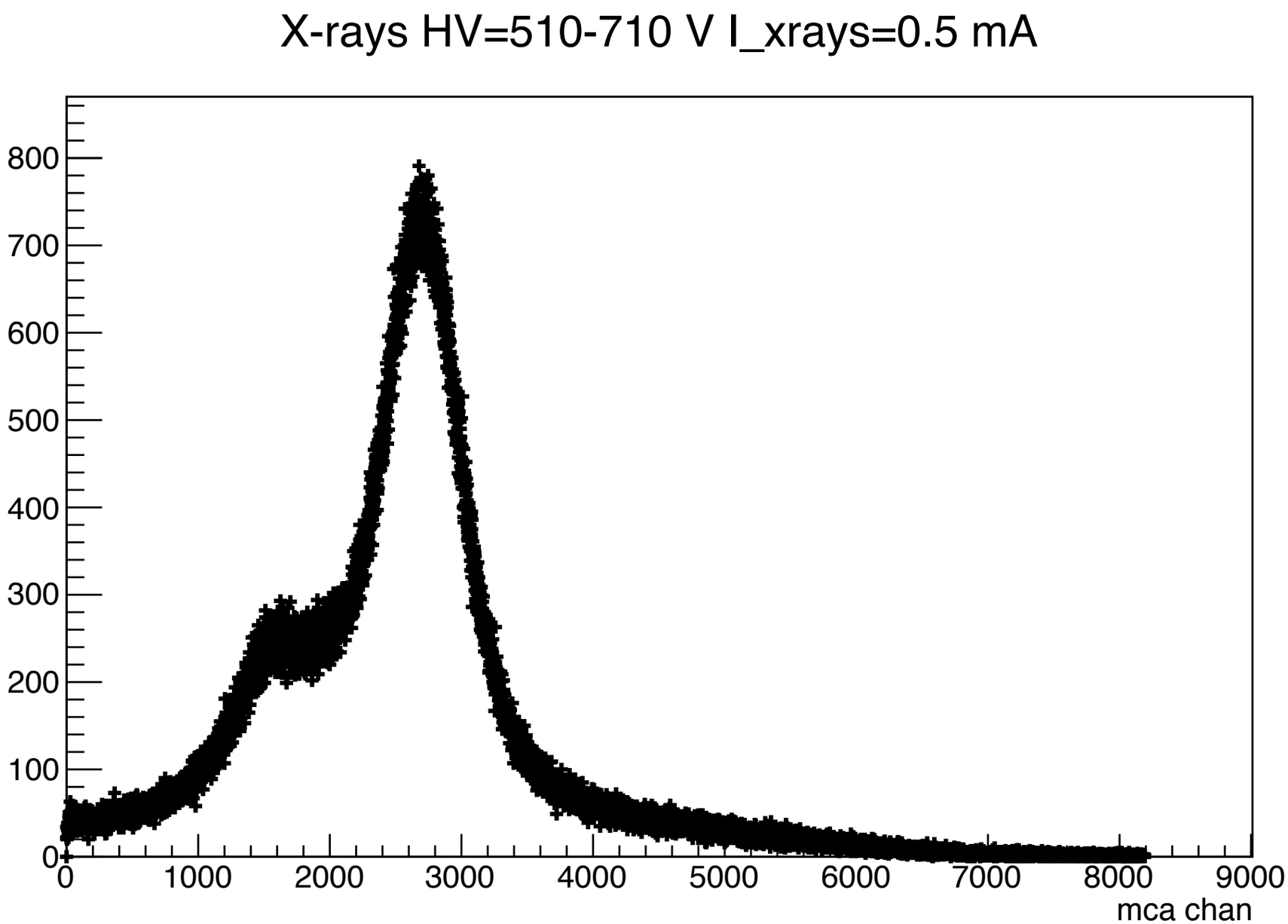
Measurements with X-rays Source



Measurements with X-rays Source

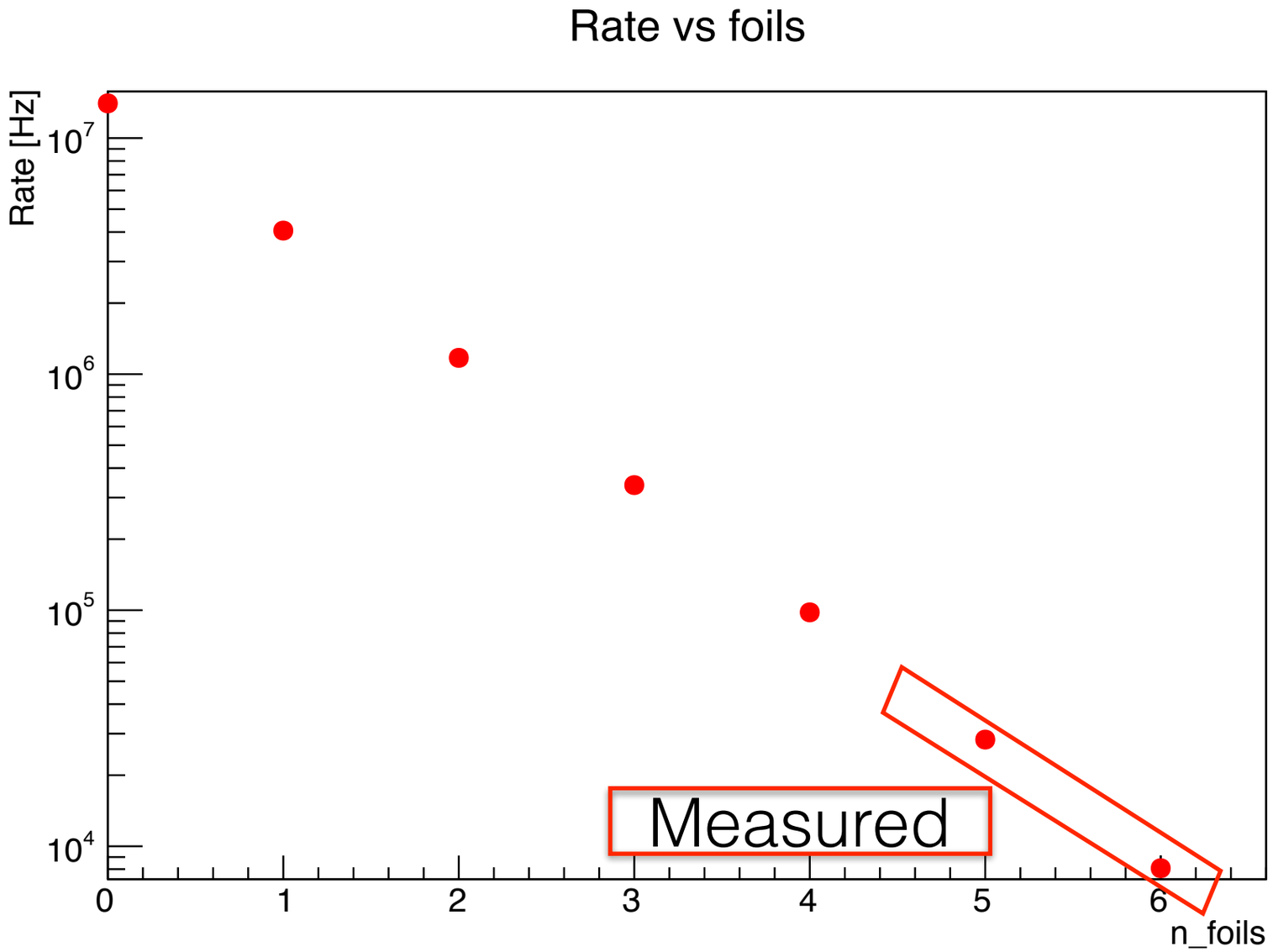


Measurements with X-rays Source



Measurements with X-rays Source

Measurements without collimator varying the **number of copper foils**. HV applied to the MESH is HV=530 V (Vdrift - Vmesh = 200 V). **PREAMPLIFIER USED.**
The attenuation factor used to extrapolate the rate is R= 3,46 (average of three measurements).

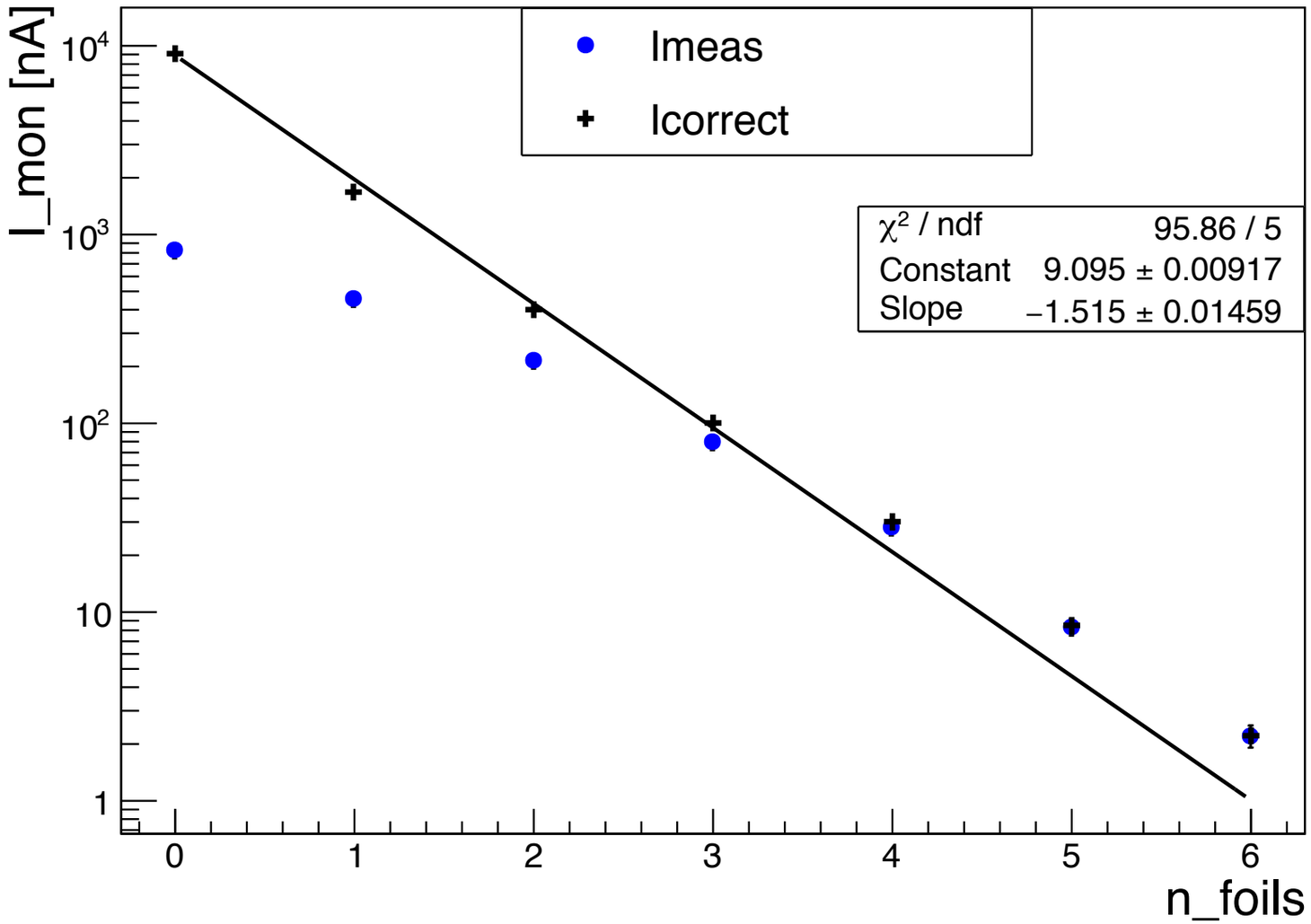


Measurements with X-rays Source

Measurements without collimator varying the number of copper foils. HV applied to the MESH is HV=530 V (Vdrift - Vmesh = 200 V).**PREAMPLIFIER USED.**

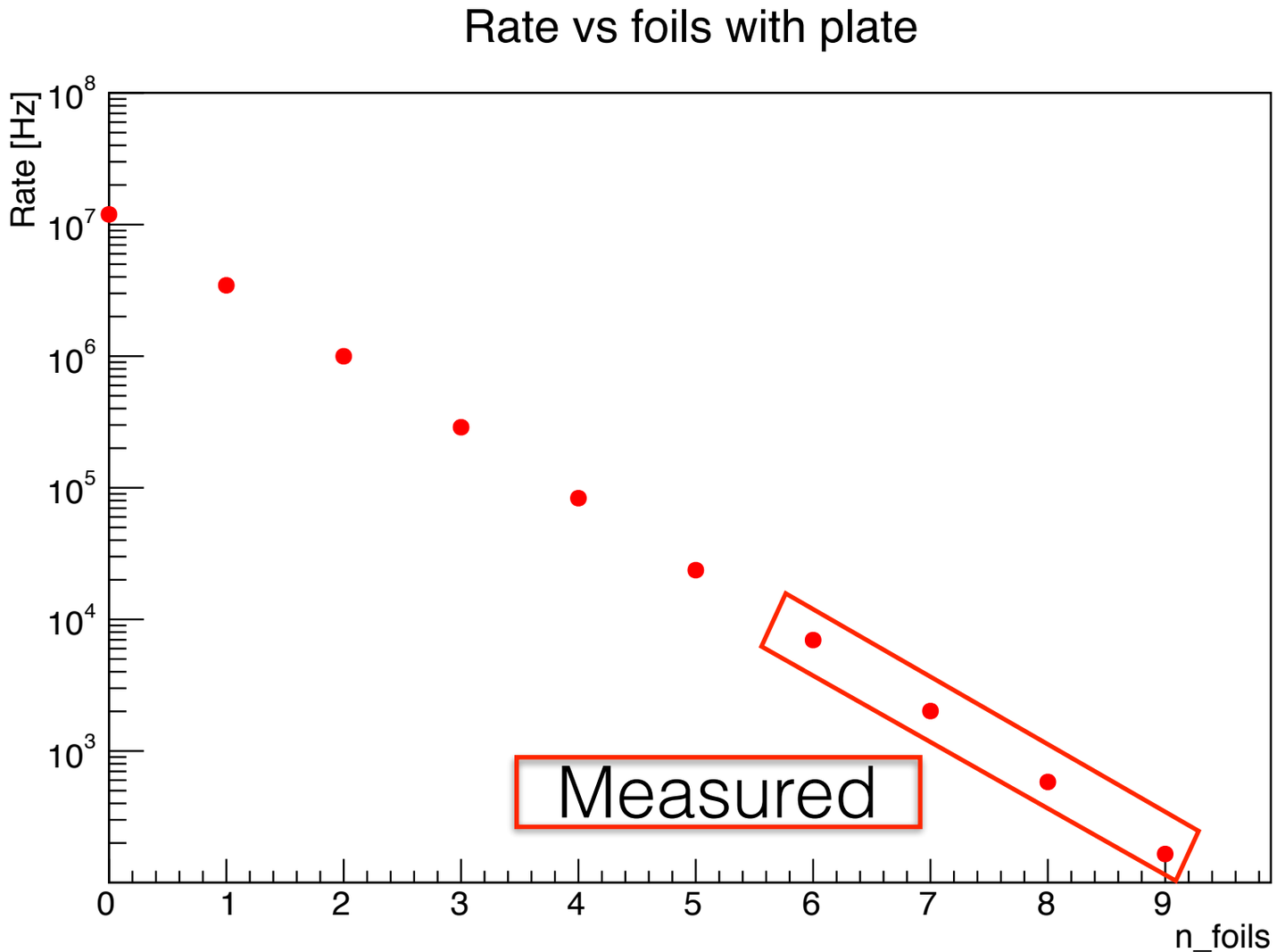
$$I_{mon}^{corr} = I_{mon} * \frac{G(530V)}{G(530V - V_{drop})}$$

I_mon vs foils



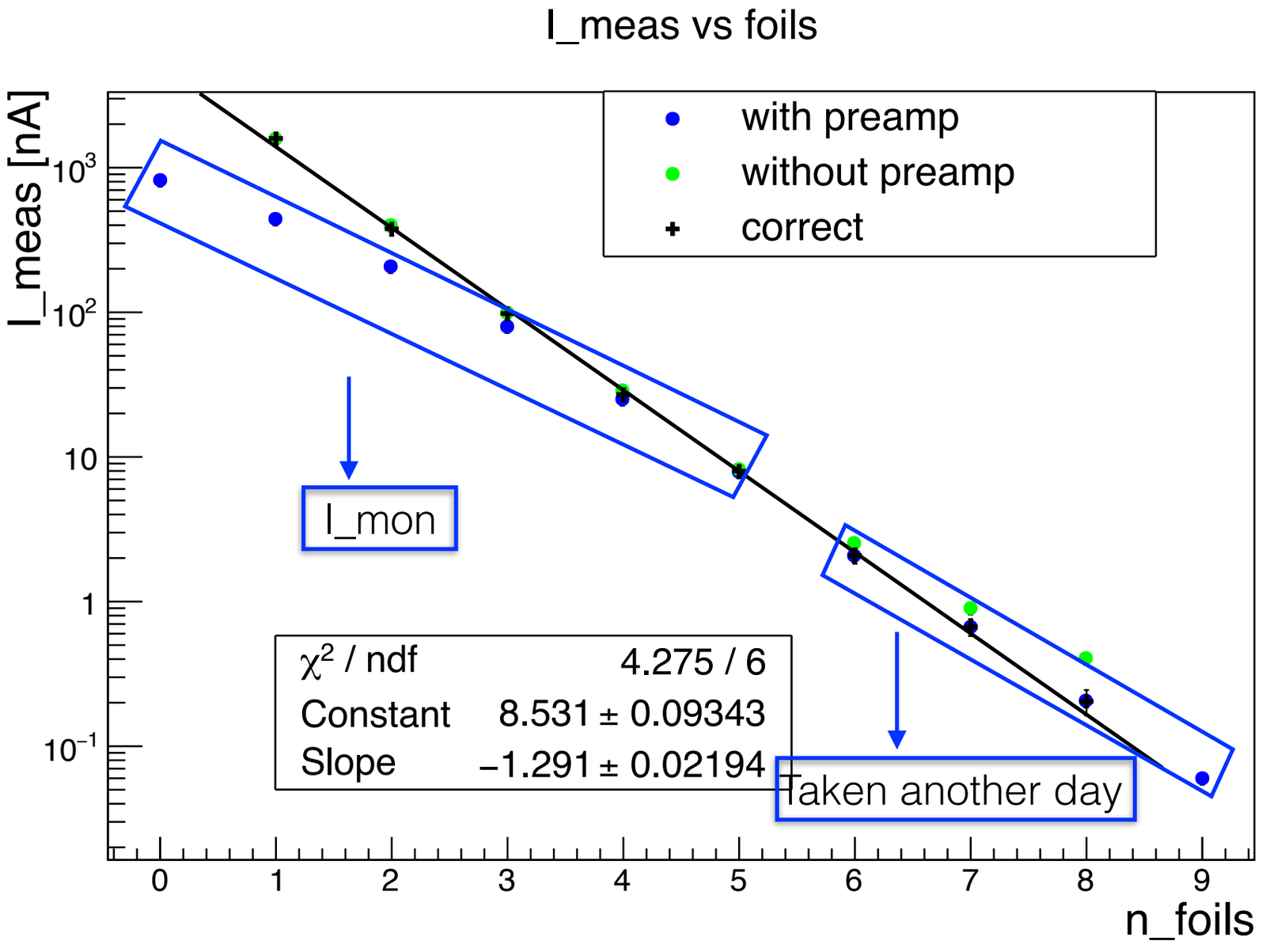
Measurements with X-rays Source

Measurements without collimator varying the **number of copper foils on a known surface** (small plate with a diameter of 11,2 mm). HV applied to the MESH is HV=530 V (Vdrift - Vmesh = 200 V). **PREAMPLIFIER USED.** The attenuation factor used to extrapolate the rate is **R= 3,46** (average of three measurements).



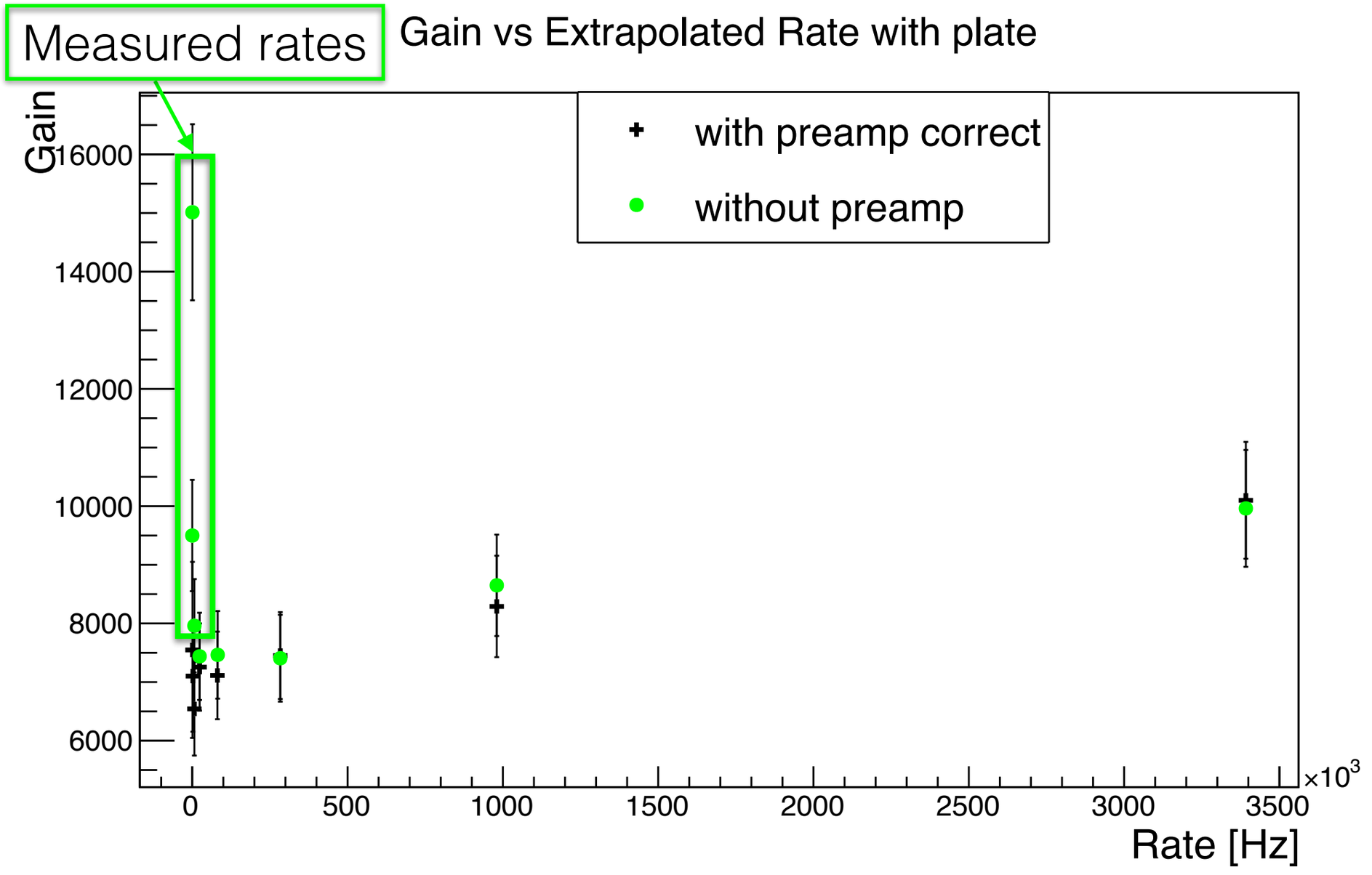
Measurements with X-rays Source

Measurements without collimator varying the **number of copper foils on a known surface** (small plate with a diameter of 11,2 mm). HV applied to the MESH is HV=530 V (Vdrift - Vmesh = 200 V); **with and without PREAMPLIFIER.**

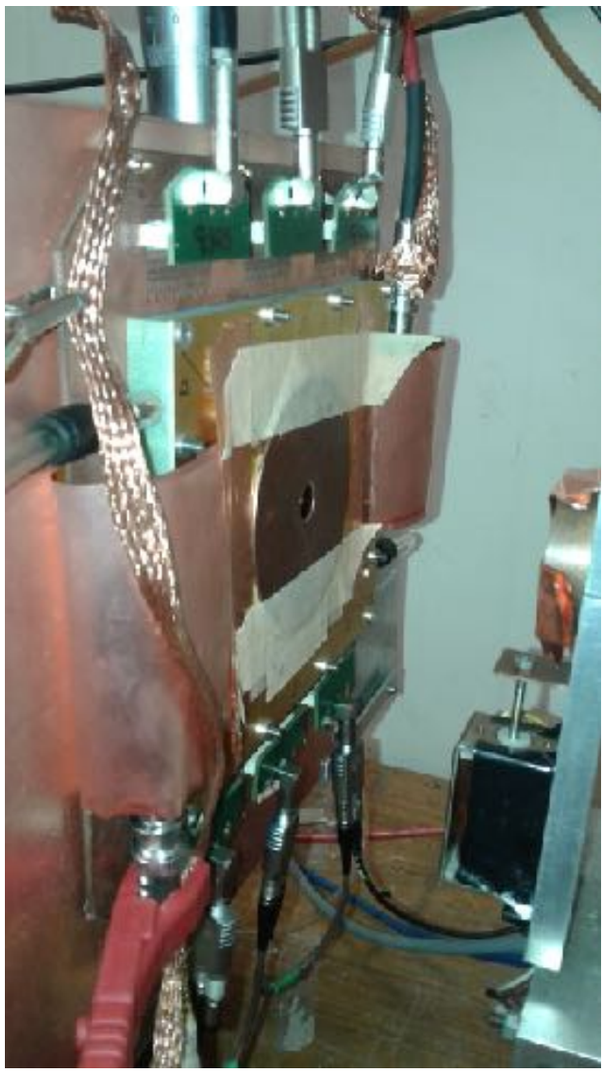


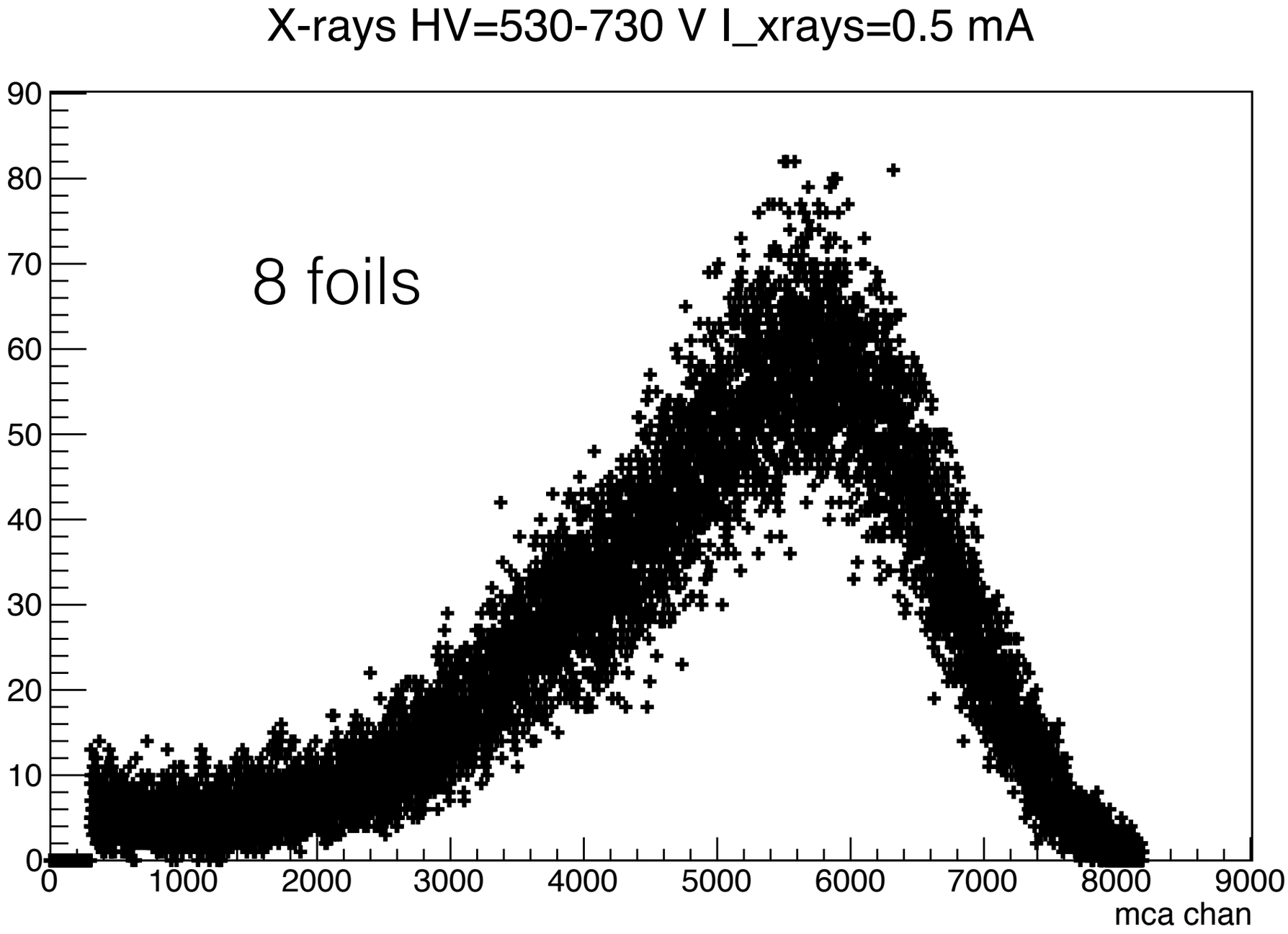
Measurements with X-rays Source

Measurements without collimator varying the **number of copper foils on a known surface** (small plate with a diameter of 11,2 mm). HV applied to the MESH is HV=530 V (Vdrift - Vmesh = 200 V); **without PREAMPLIFIER.**

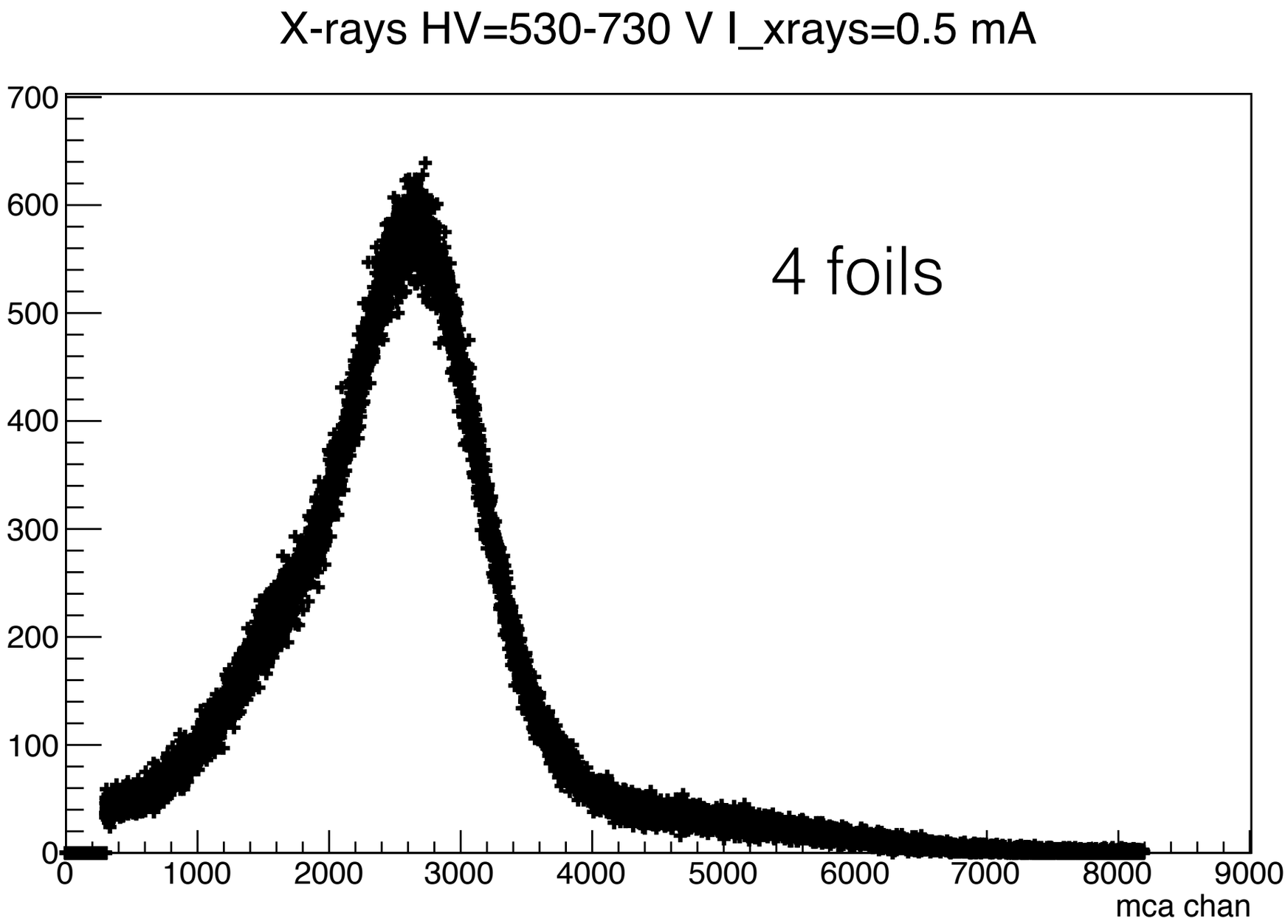


Measurements with X-rays Source





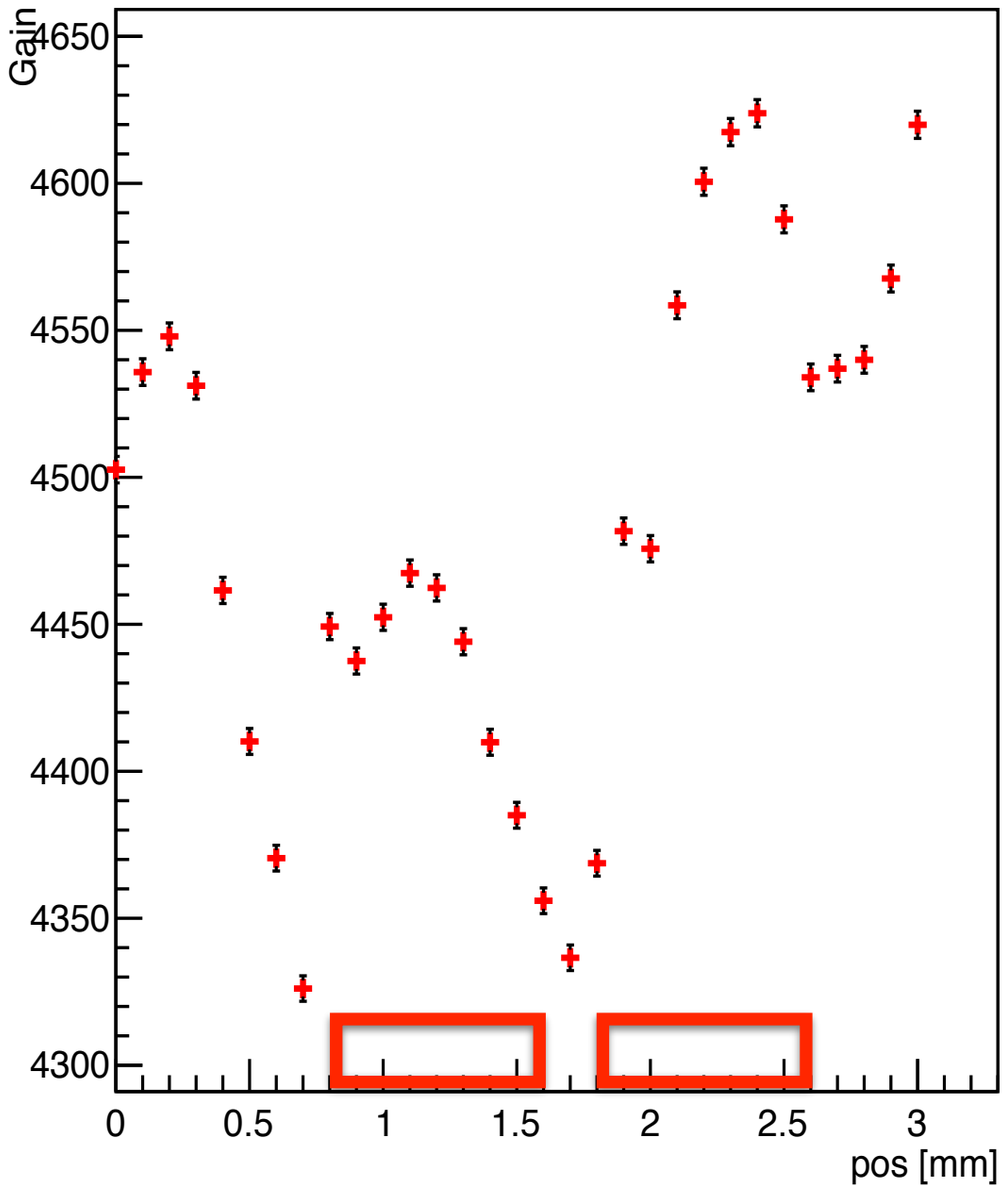
Measurements with X-rays Source



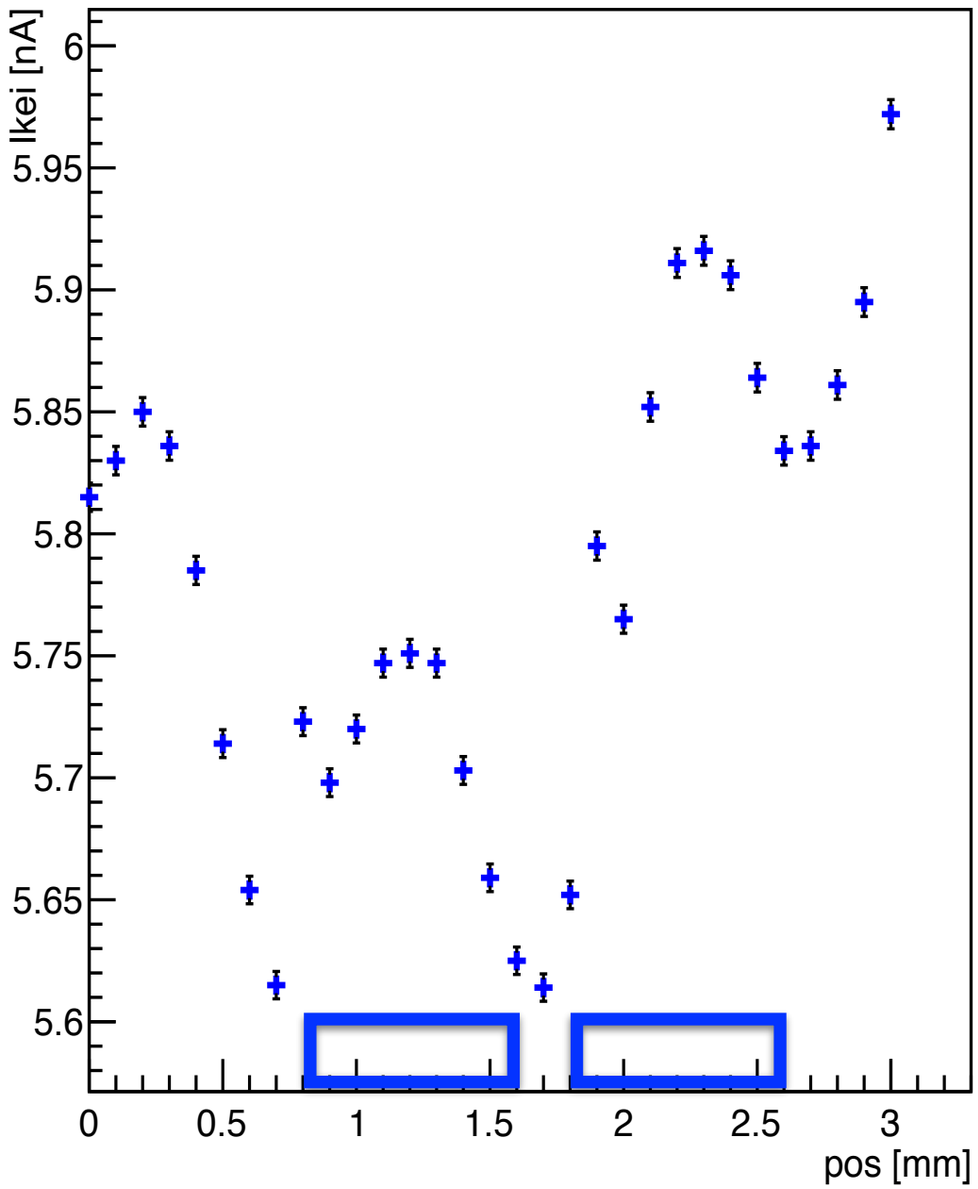
Measurements with X-rays Source

X Scan (100 micron) using small plate. **PREAMPLIFIER used.**

Gain vs pos_scanx (100 micron)



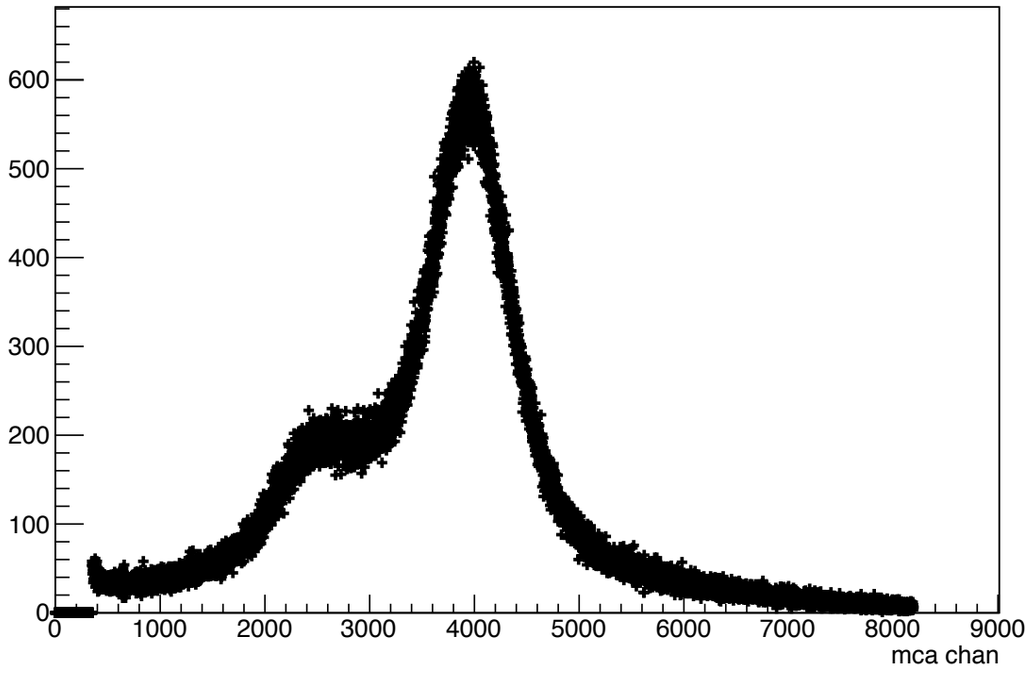
IKeithley vs pos_scanx



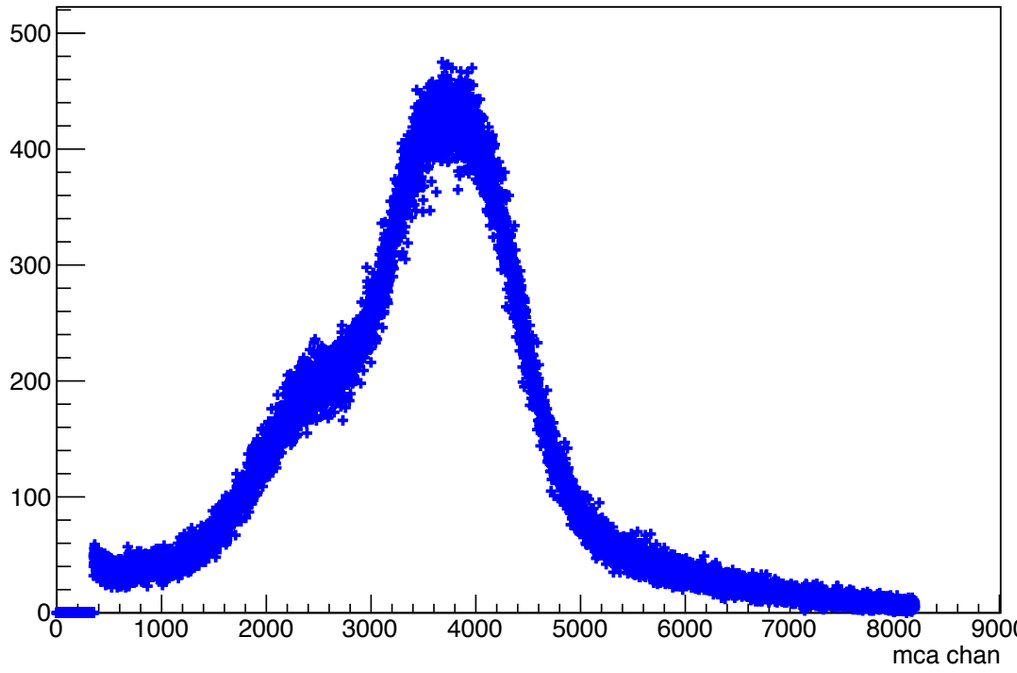
Measurements with X-rays Source

X Scan (100 micron) using small plate. **PREAMPLIFIER used.**

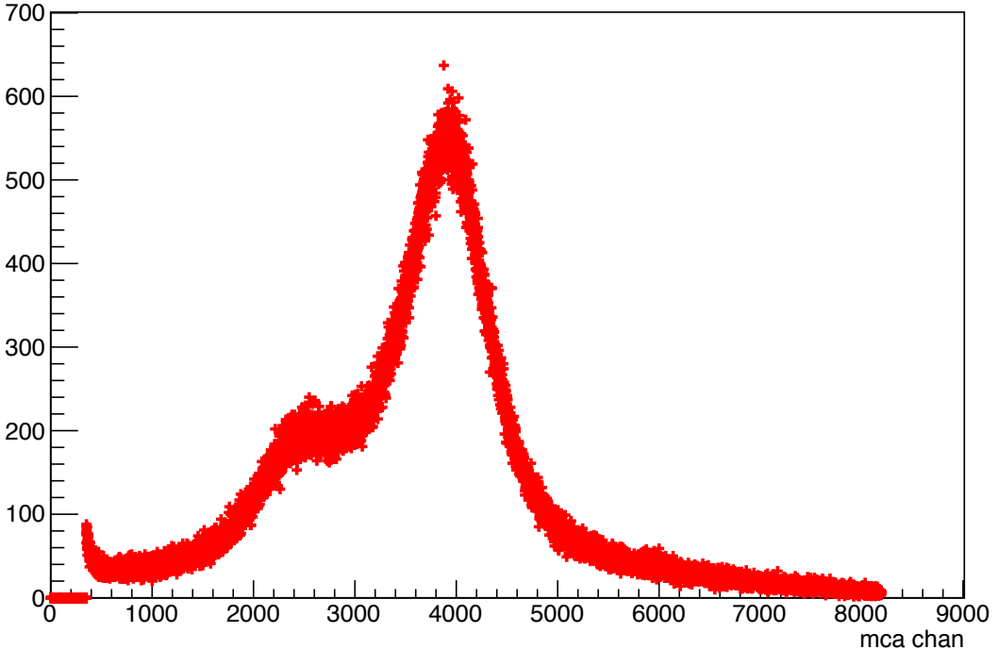
Peak 1



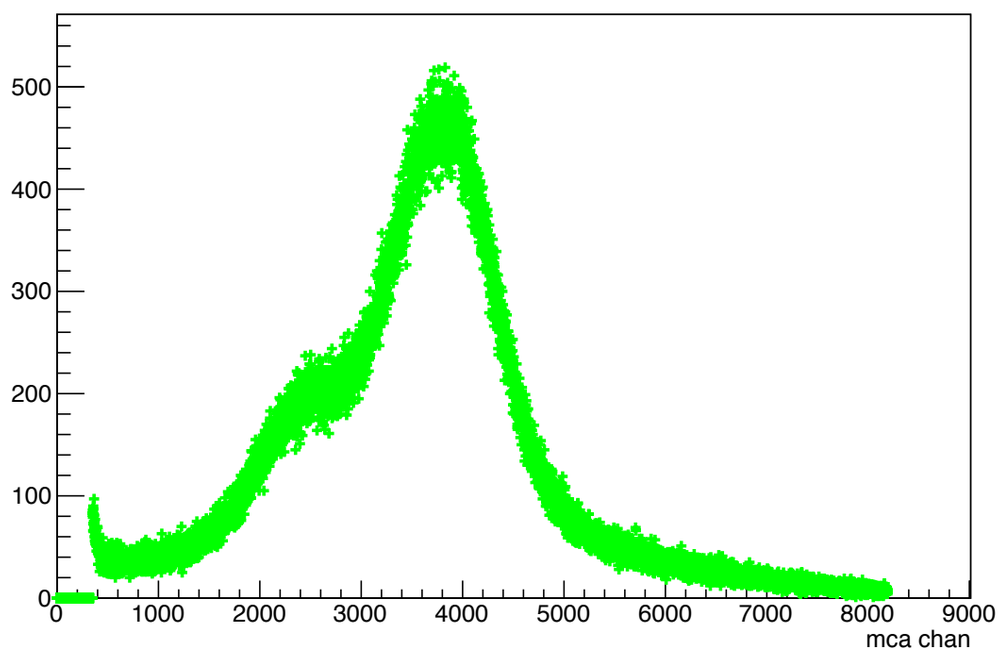
Valley 1



Peak 2



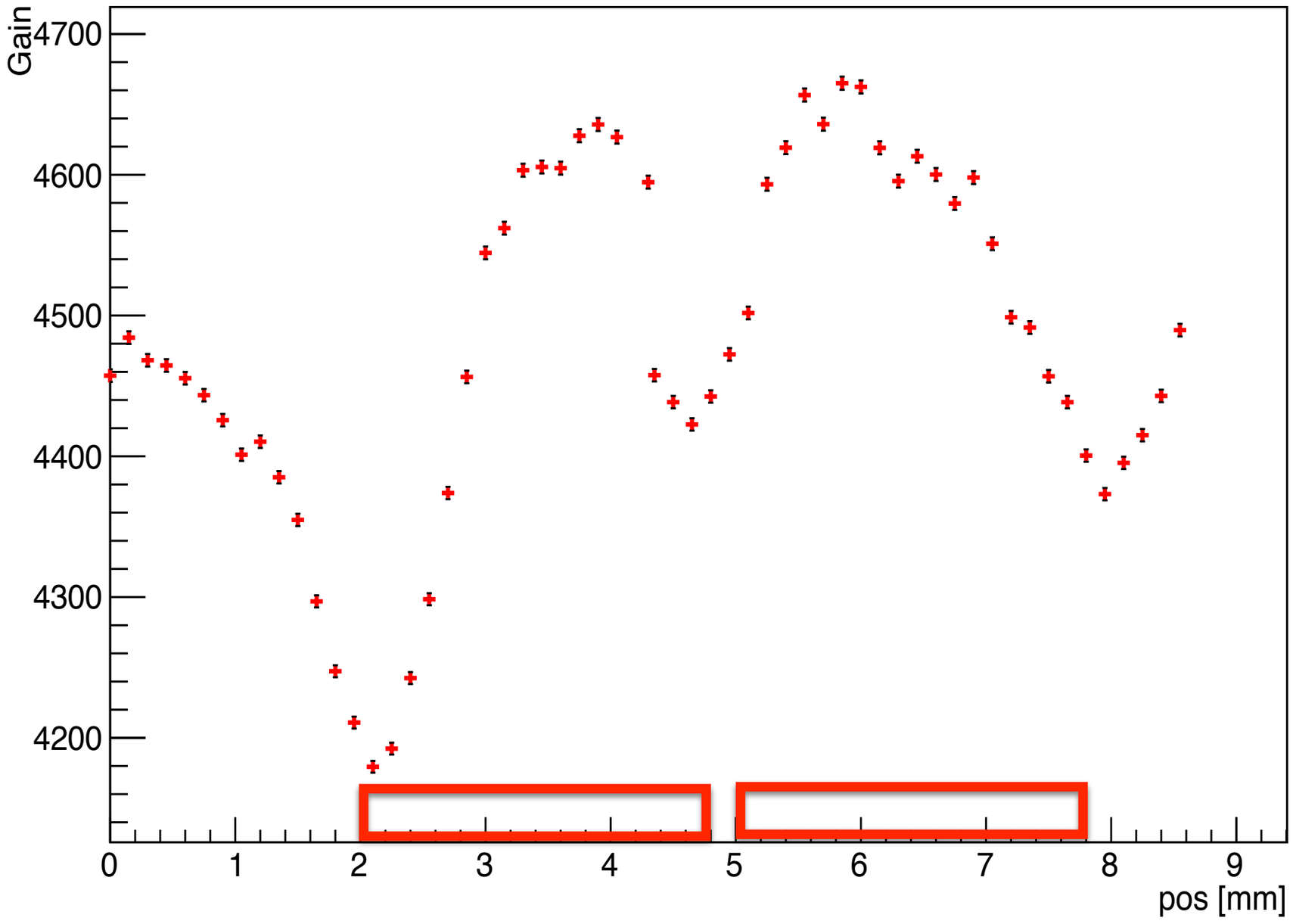
Valley 2



Measurements with X-rays Source

Y Scan (150 micron) using small plate. **PREAMPLIFIER used.**

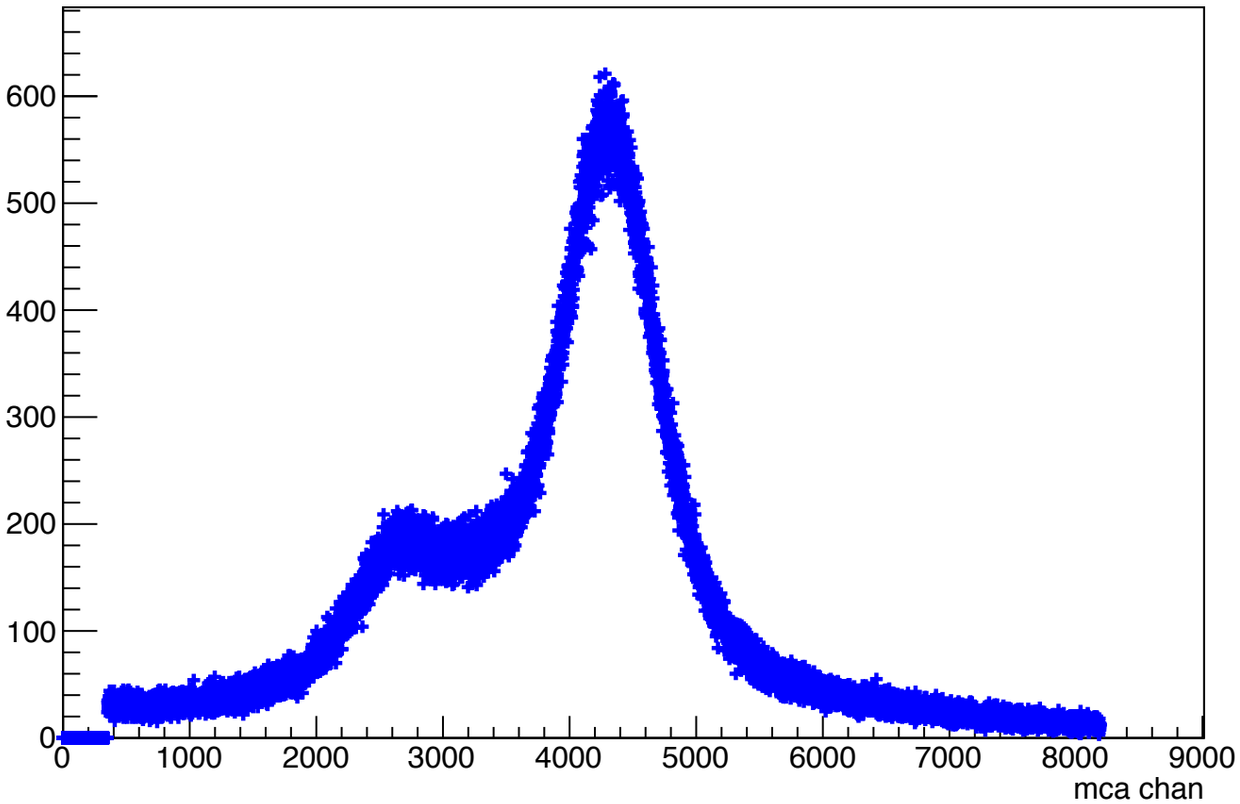
Gain vs pos_scany (150 micron)



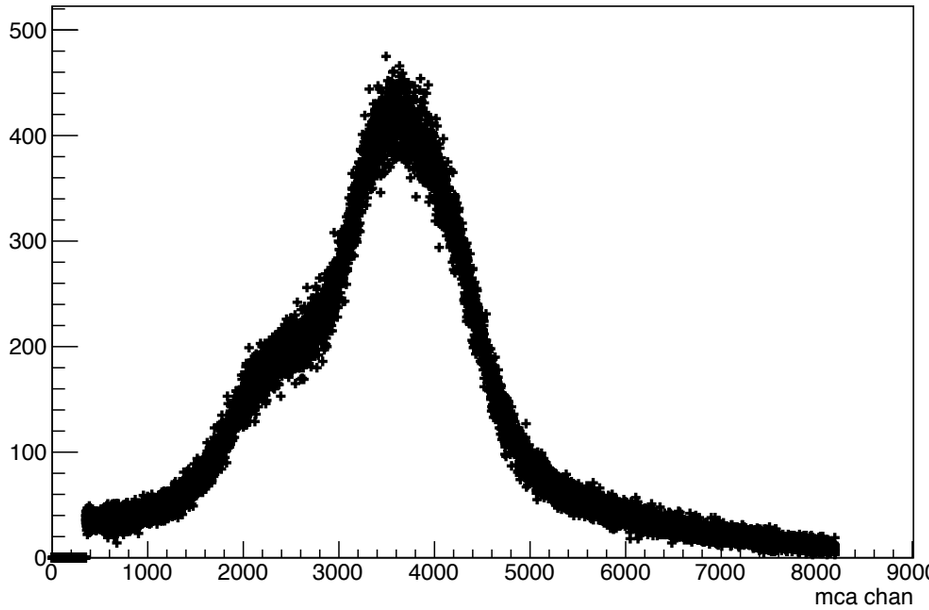
Measurements with X-rays Source

Y Scan (150 micron) using small plate. **PREAMPLIFIER used.**

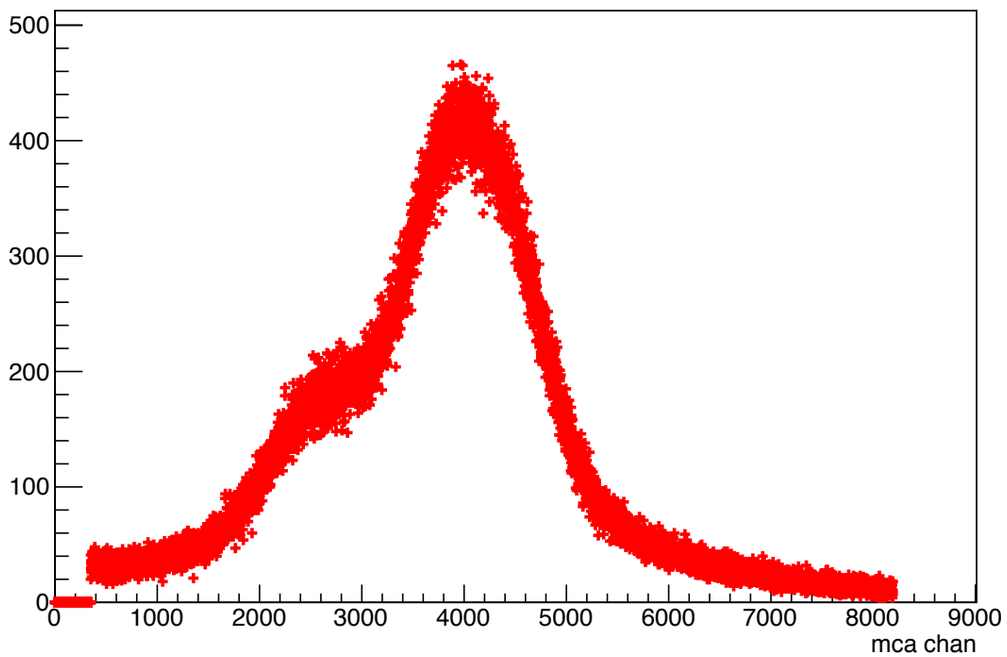
Peak 2



Valley 1



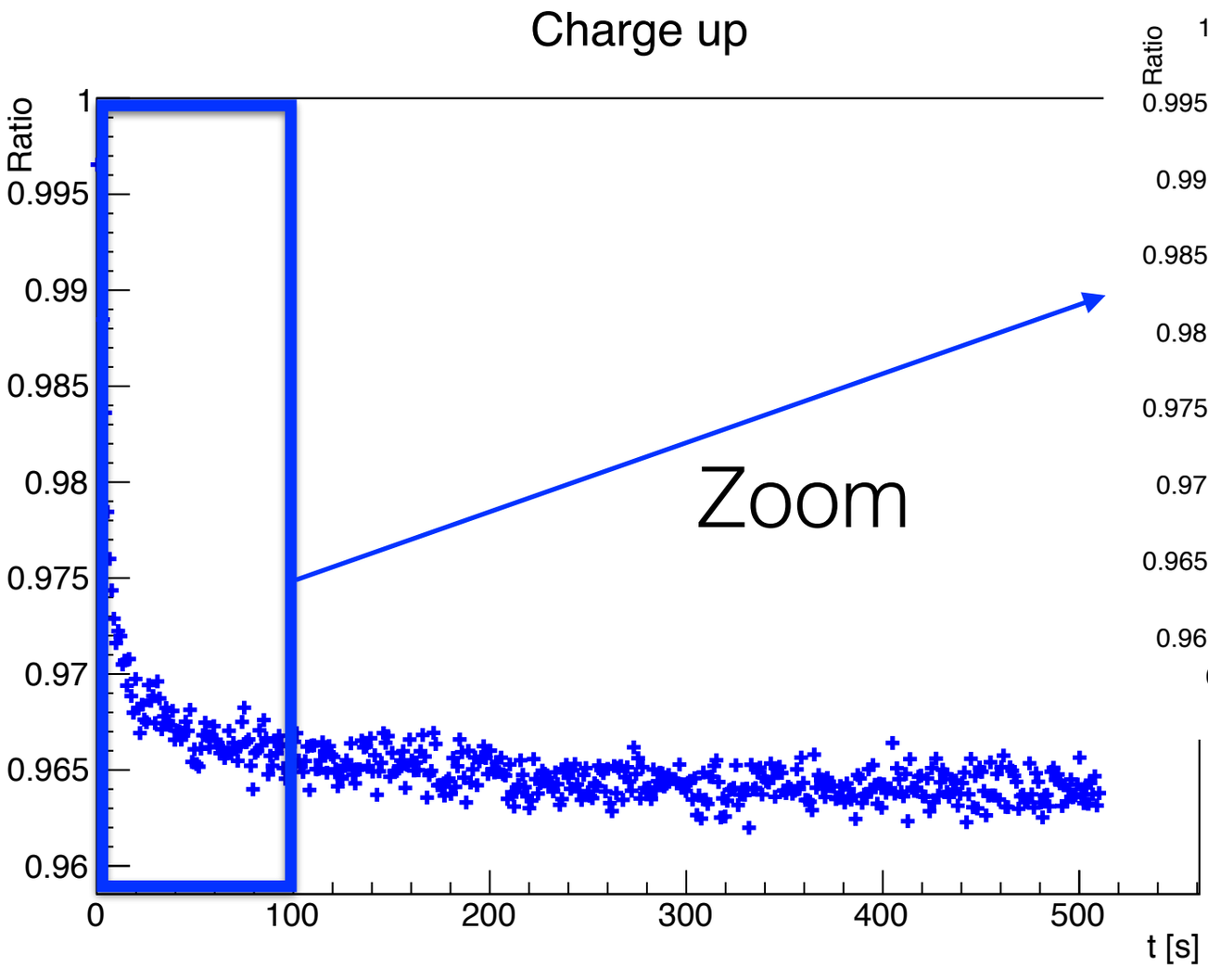
Valley 2

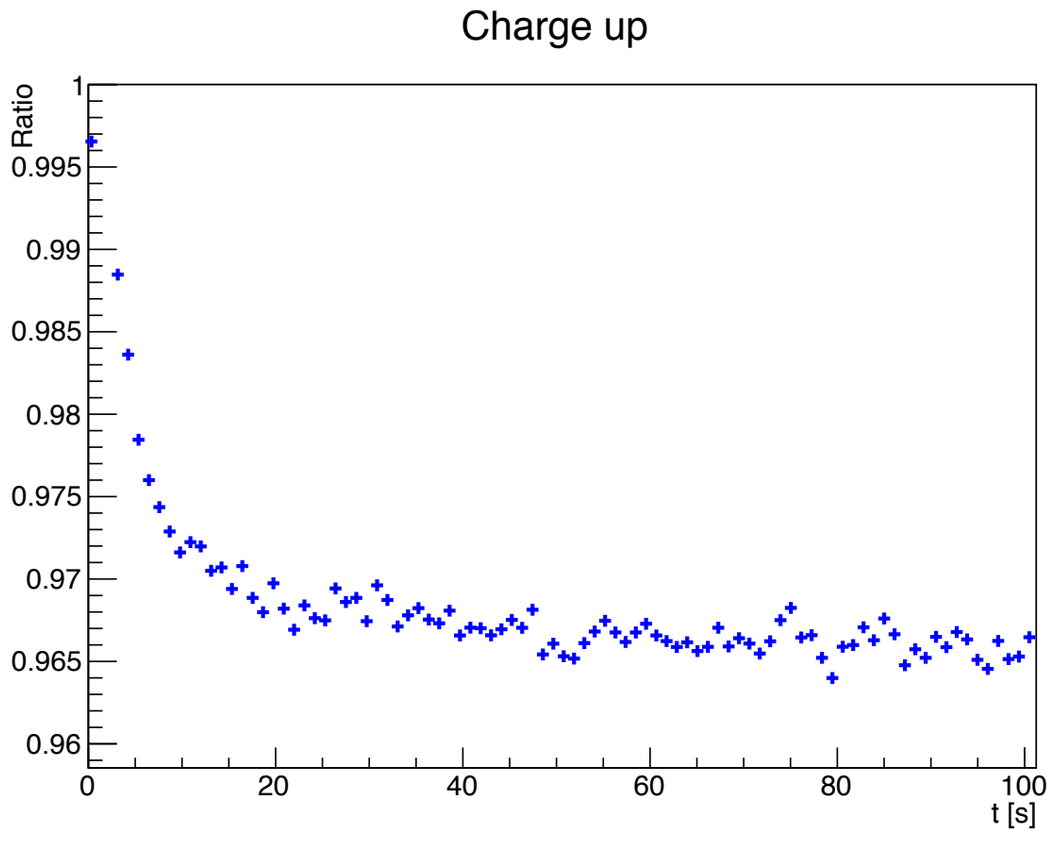


Measurements with X-rays Source

Charge up

HV applied to the MESH is HV=536 V, V_drift=740 V. **Ratio=Imeas/Imax.**





Measurements with X-rays Source

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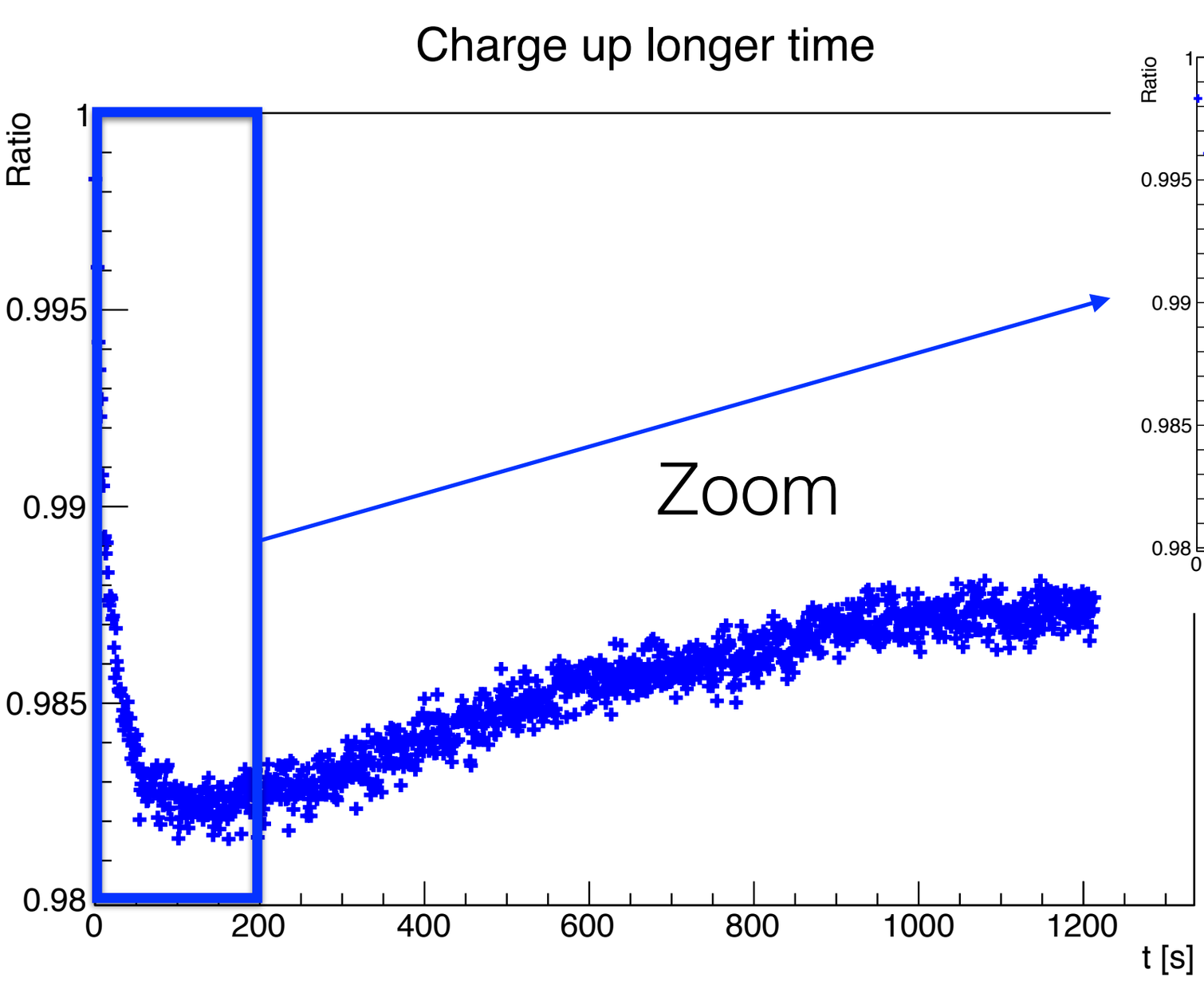
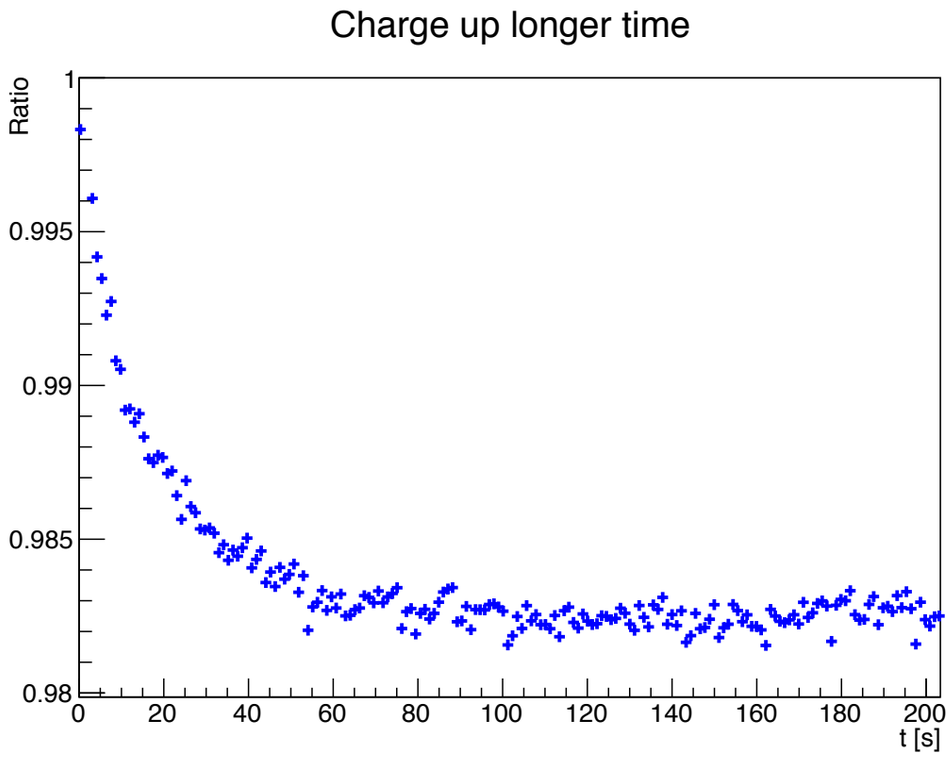
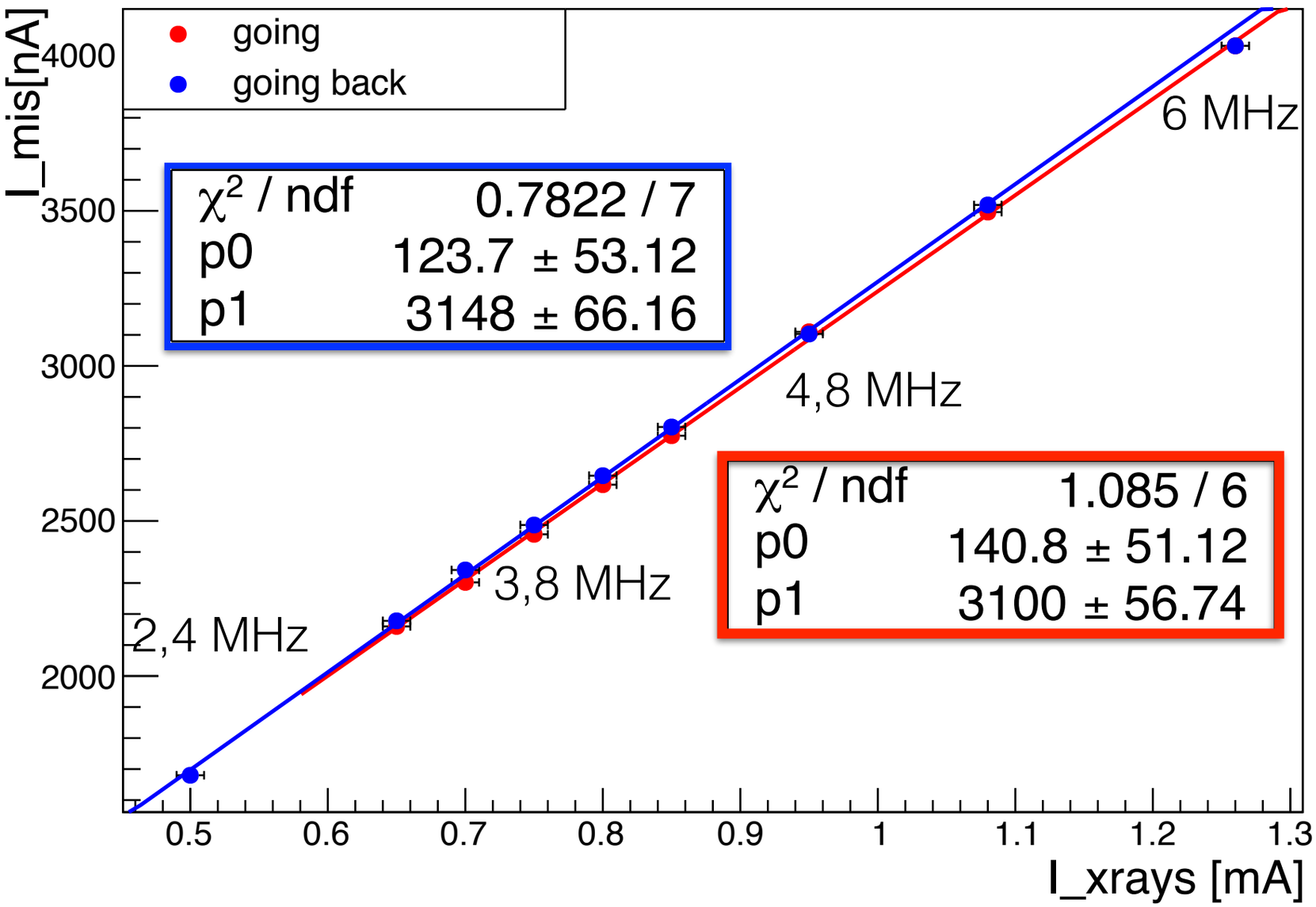




Measurements with X-rays Source

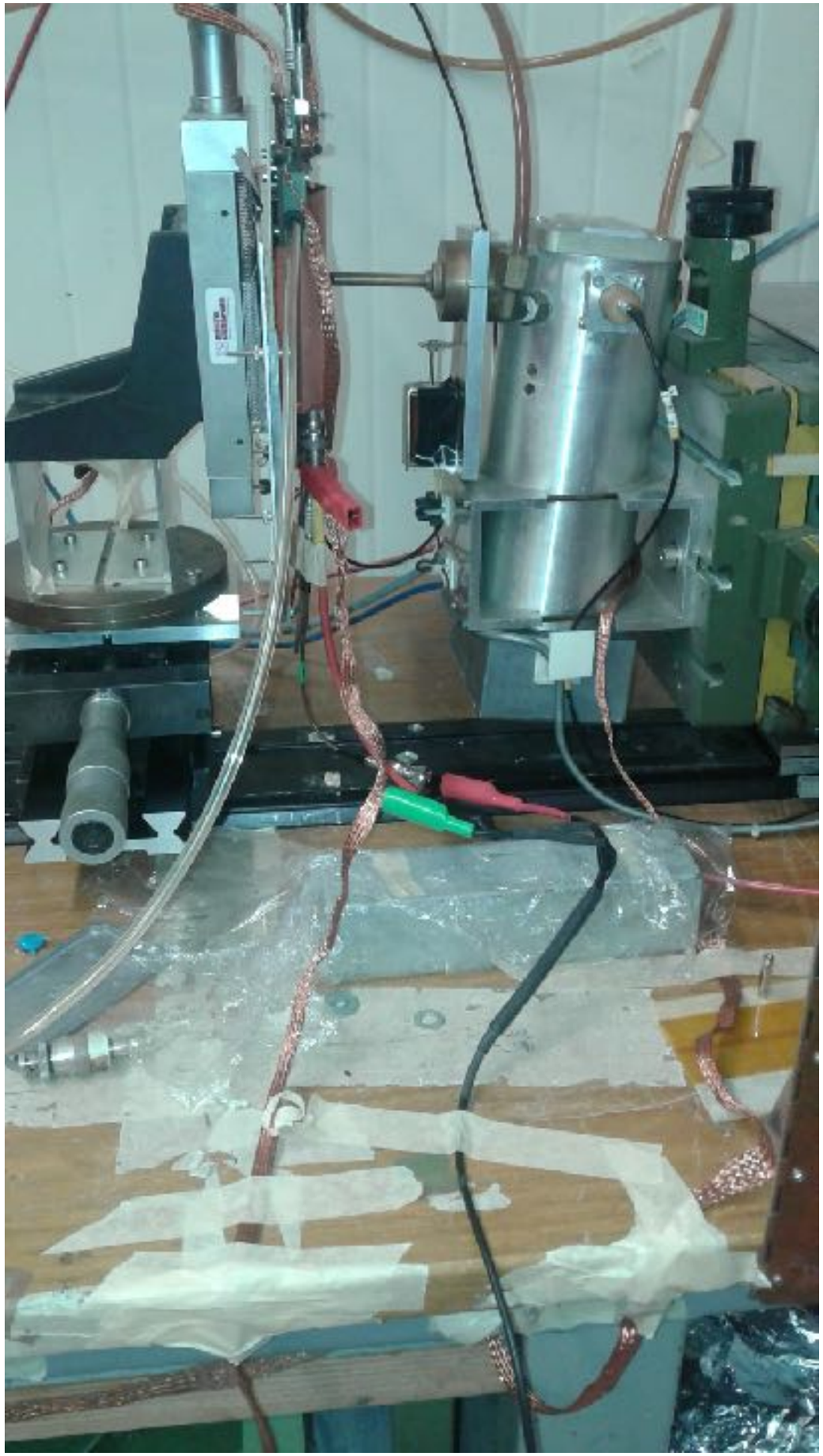
Measurements of Linearity vs High Rate

$$Rate_{extr} = \frac{R_{collimator} \times 100}{attenuation\ factor}$$



BACKUP


Fe.55
3,28MBq
ORTEC



Measurements with X-rays Source