

# Update on MCP-PMT investigations

Klaus Föhl

PID session - PANDA meeting at GSI

6 March 2018

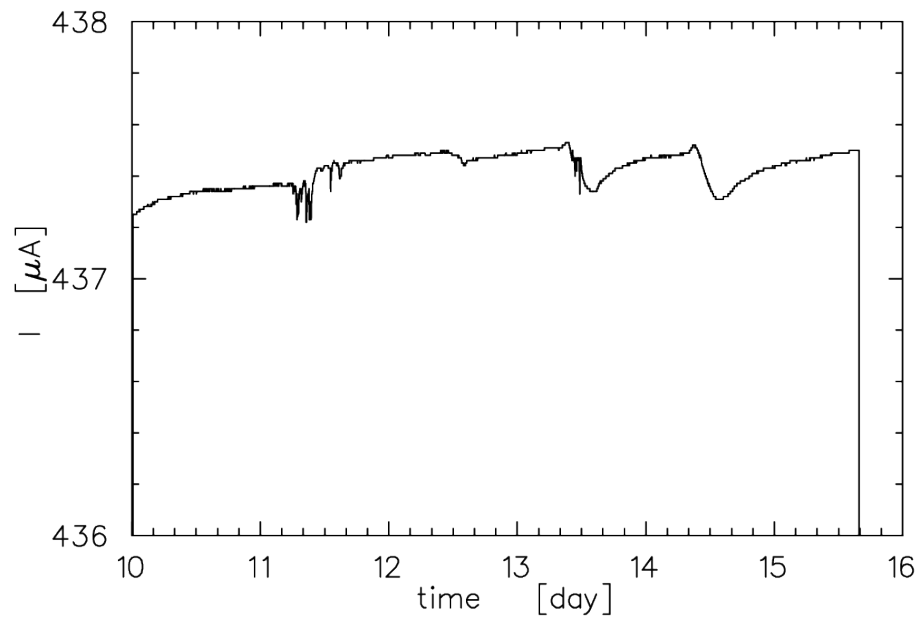
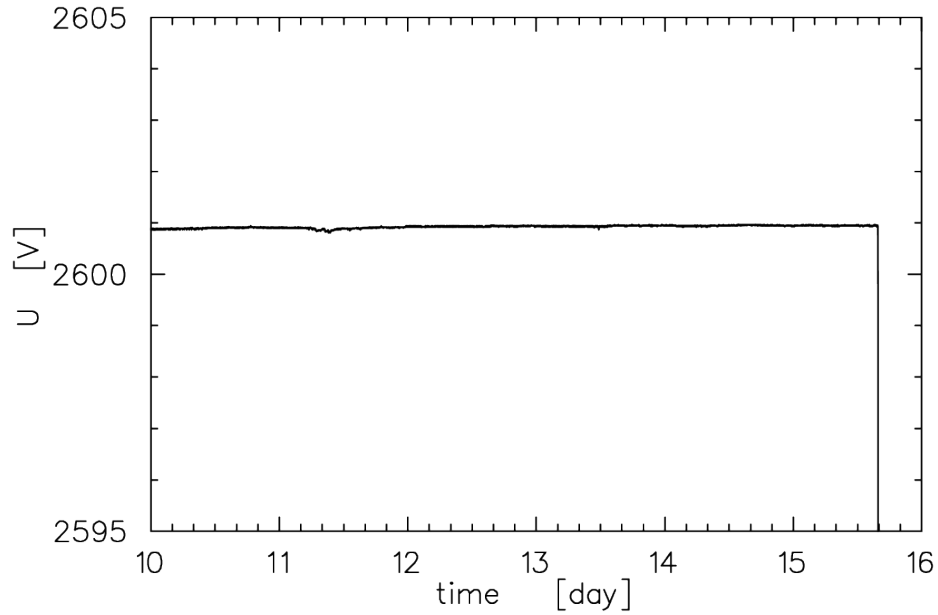
- MCP-PMT Photonis as “reference”
  - $I(t)$  curves, MCP surface defects
- MCP-PMT Hamamatsu YS0026
  - MCP surface, arcing traces, white stuff
- MCP-PMT Hamamatsu JH0245
  - excess current, current event, small marks

---

# Photonis

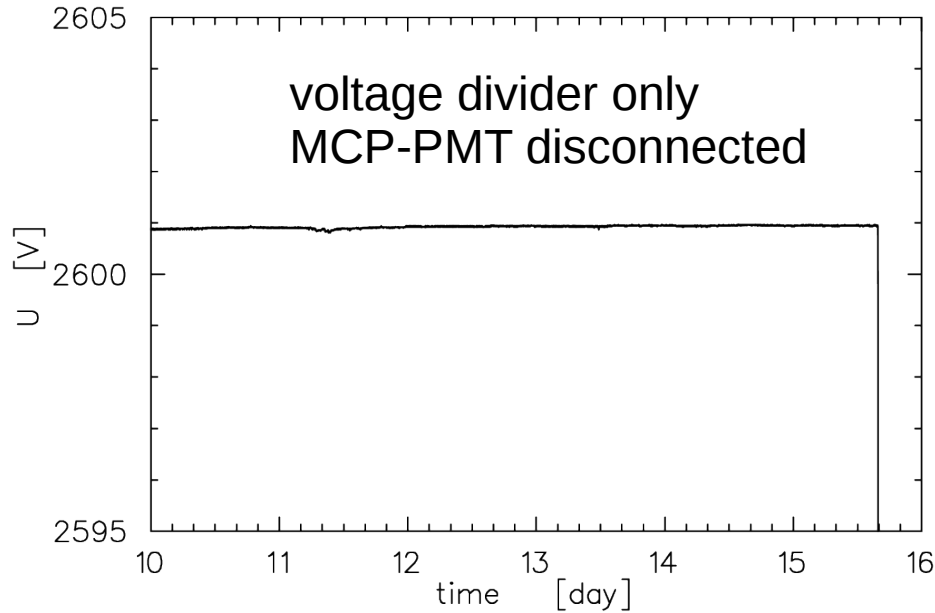
# Logging curves U and I – stability test

/home/klaus/dienstliches/mcp-hamamatsu-4/Klaus-CAEN-logfiles/u-i-plot-20180210-20180215.eps

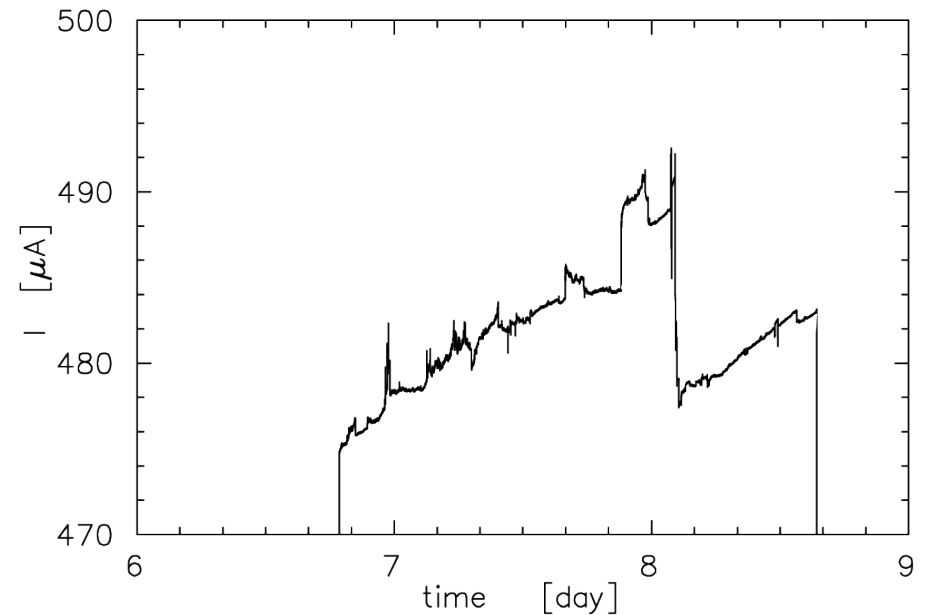
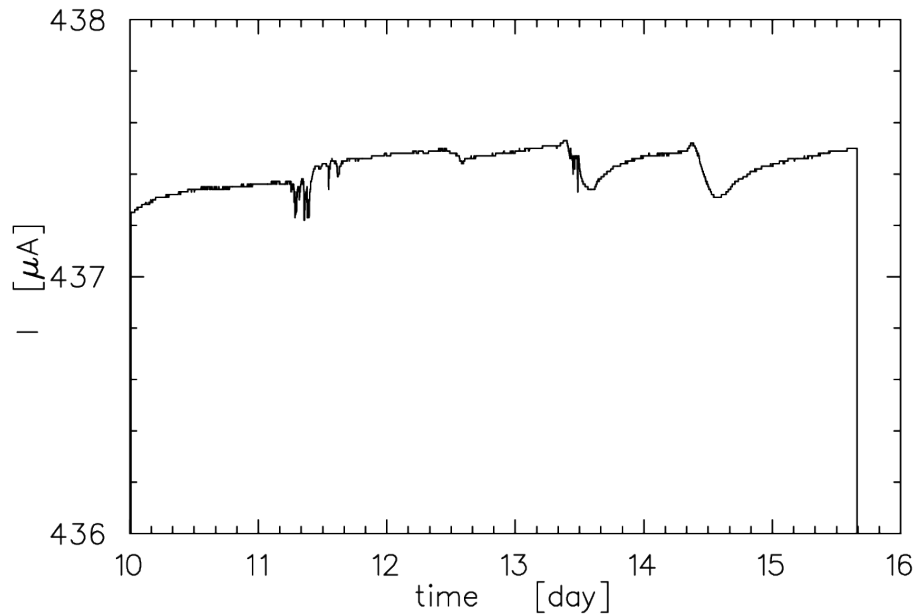
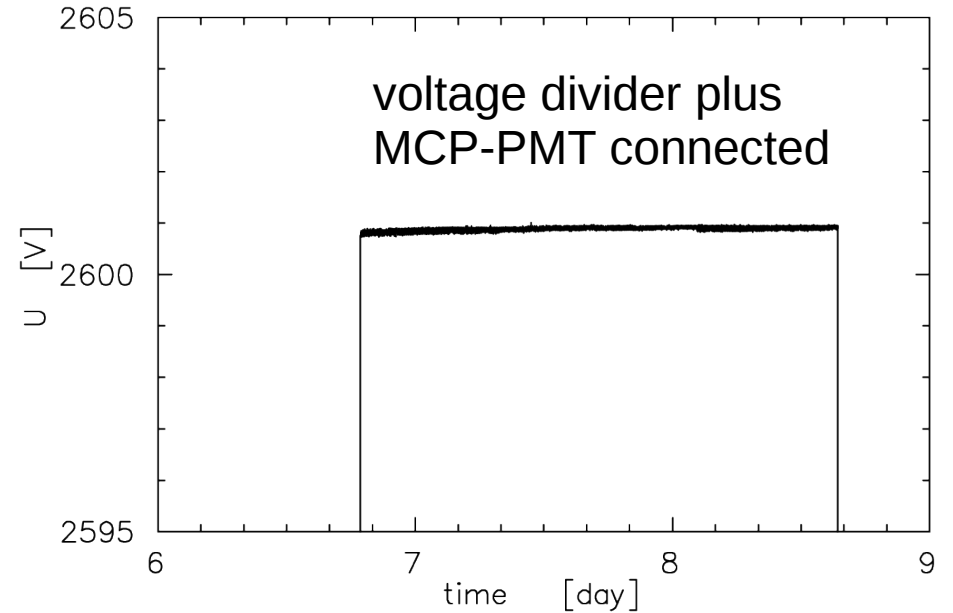


# Logging curves U and I – no light !

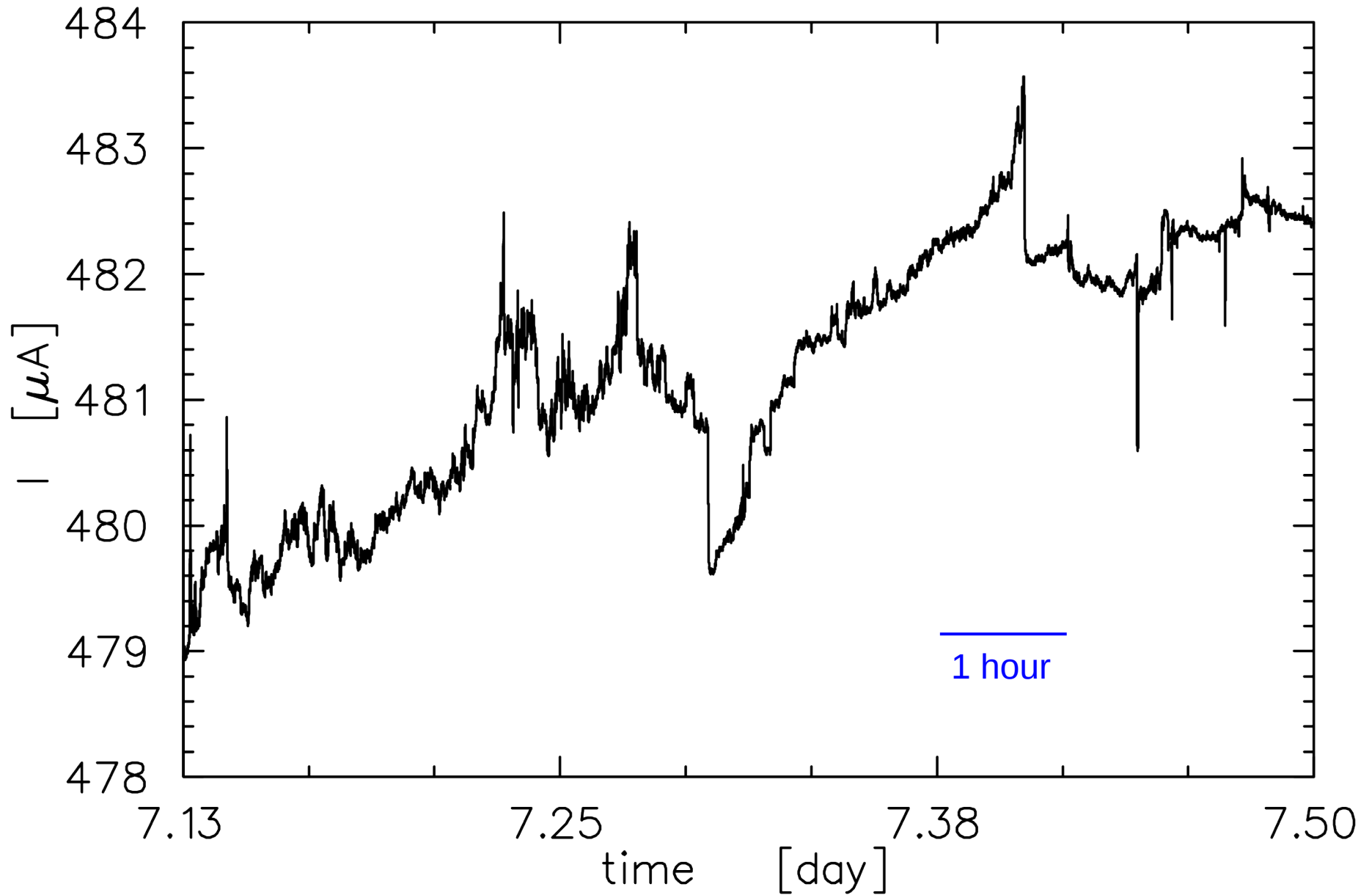
/home/klaus/dienstliches/mcp-hamamatsu-4/Klaus-CAEN-logfiles/u-i-plot-20180210-20180215.eps



/home/klaus/dienstliches/mcp-hamamatsu-4/Klaus-CAEN-logfiles/u-i-plot-20180206-20180208-v1.eps

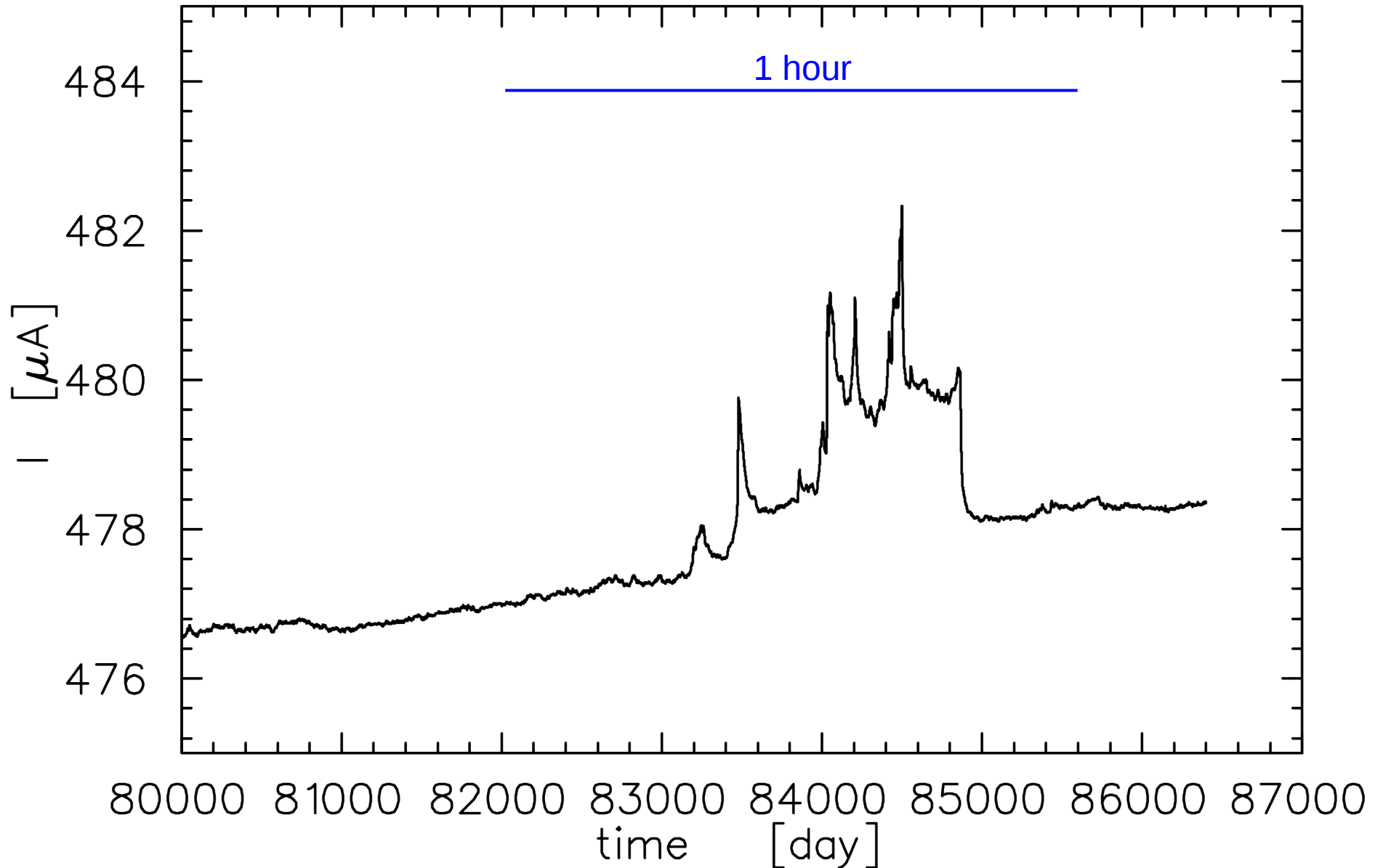


# Current - detail 1



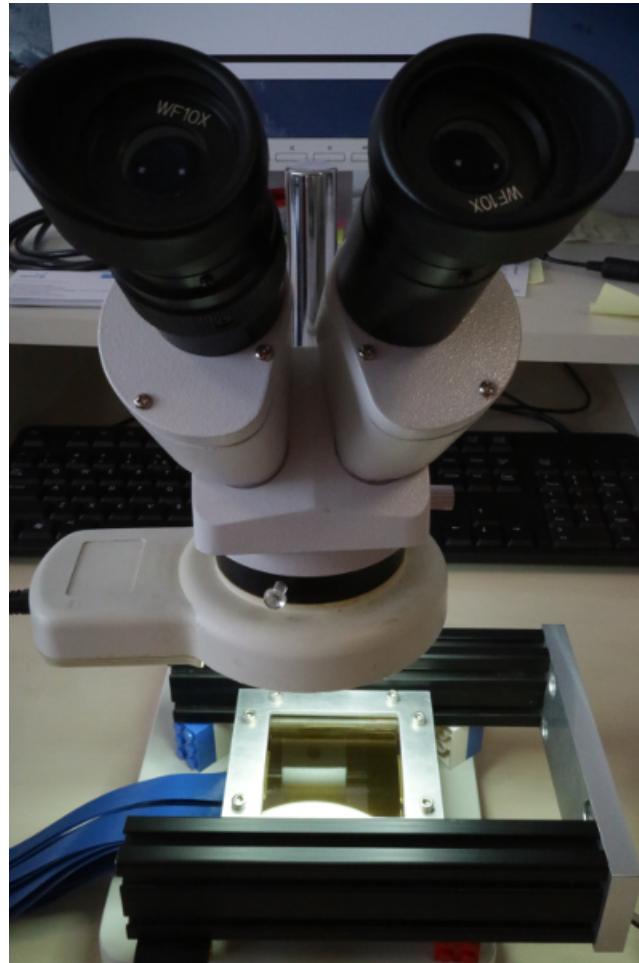
# Current – detail 2

/home/klaus/dienstliches/mcp-hamamatsu-4/Klaus-CAEN-logfiles/i-plot-20180206-v2.eps



# Excess power of few mW – localised deposition?

~5 mW extra power – deposited into the sensor, unfortunately not only into the resistors

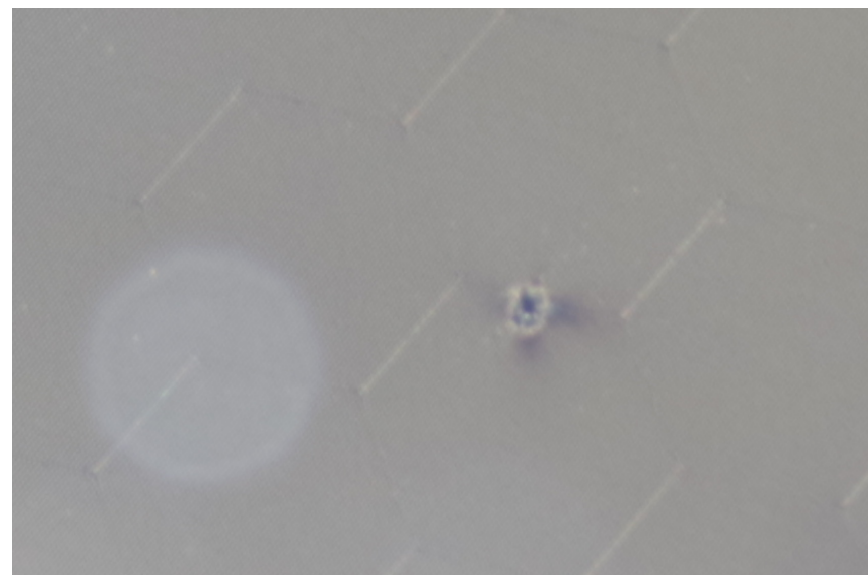


looking for localised visual signs

polarisation filters used with mW lasers

# Two surface damages on 1<sup>st</sup> MCP front

---



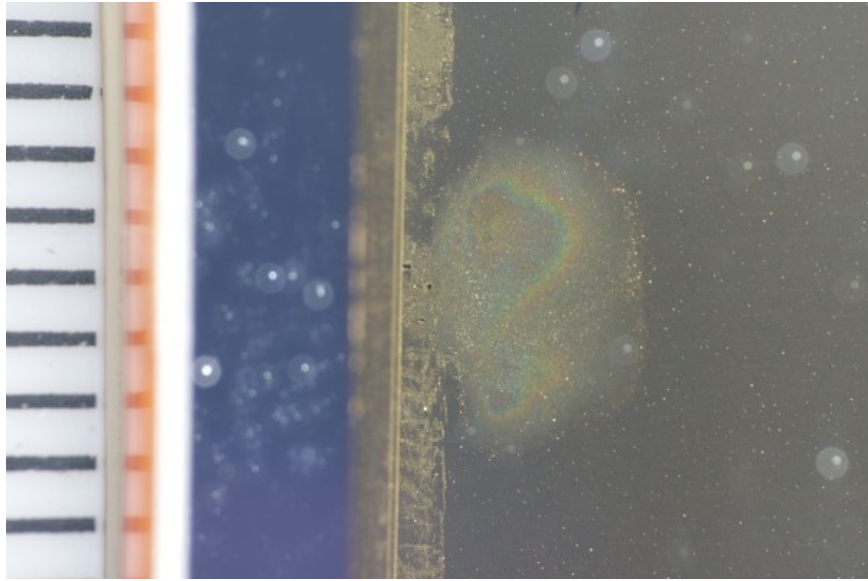


---

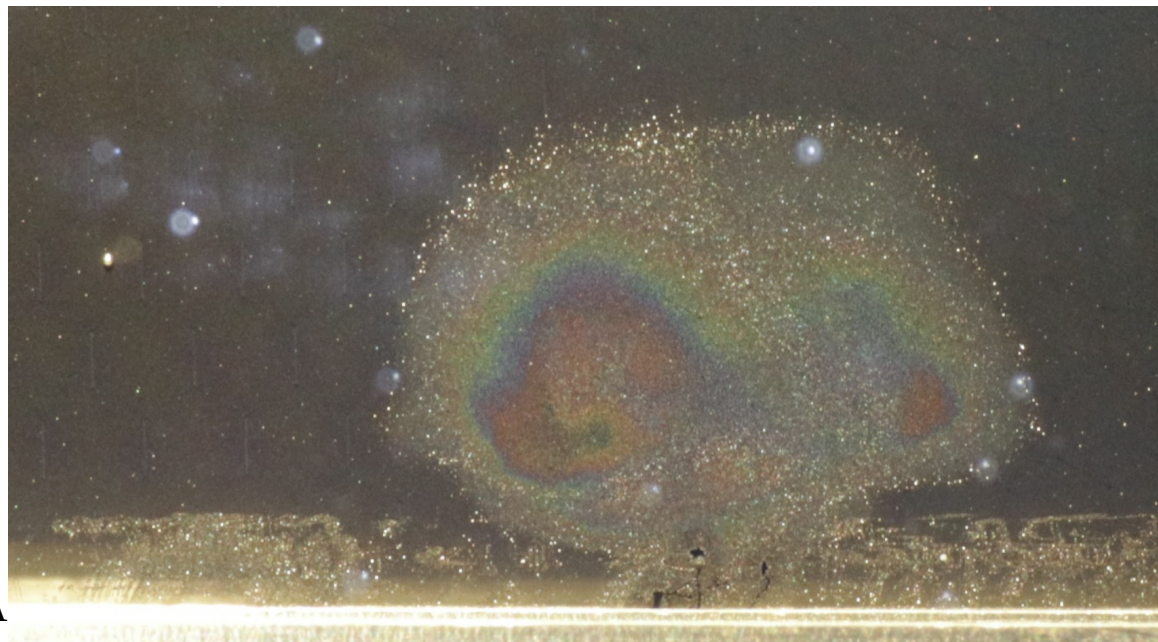
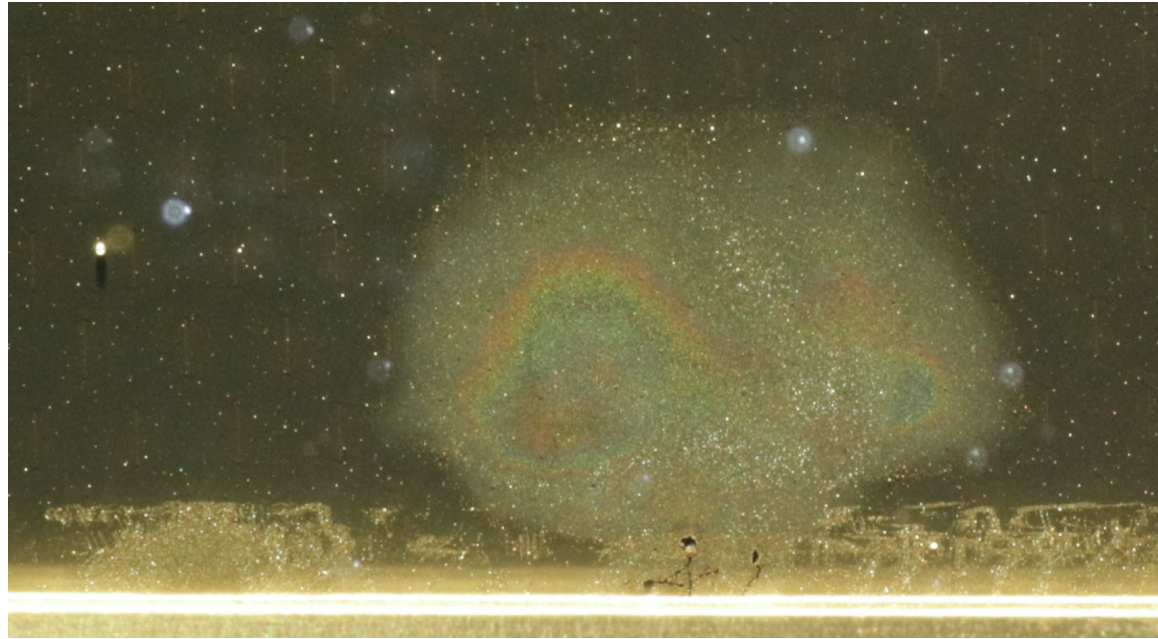
# Hamamatsu YS0026

# Overview

---

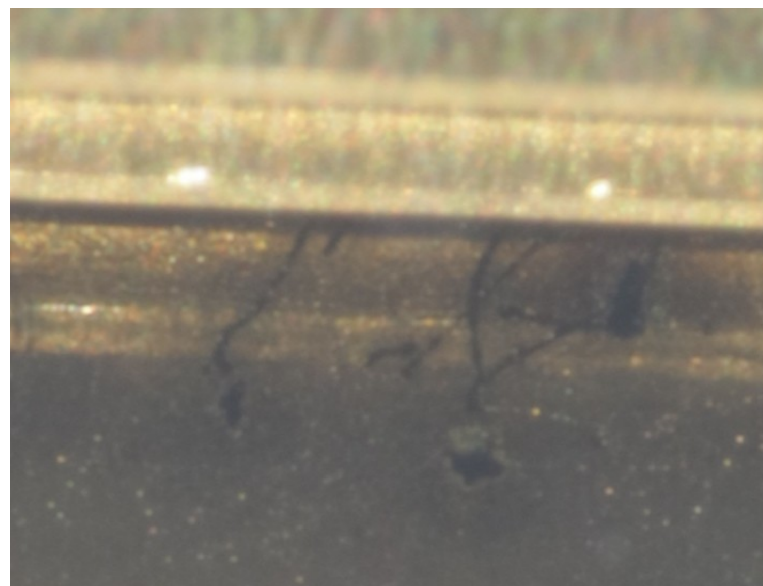


mm



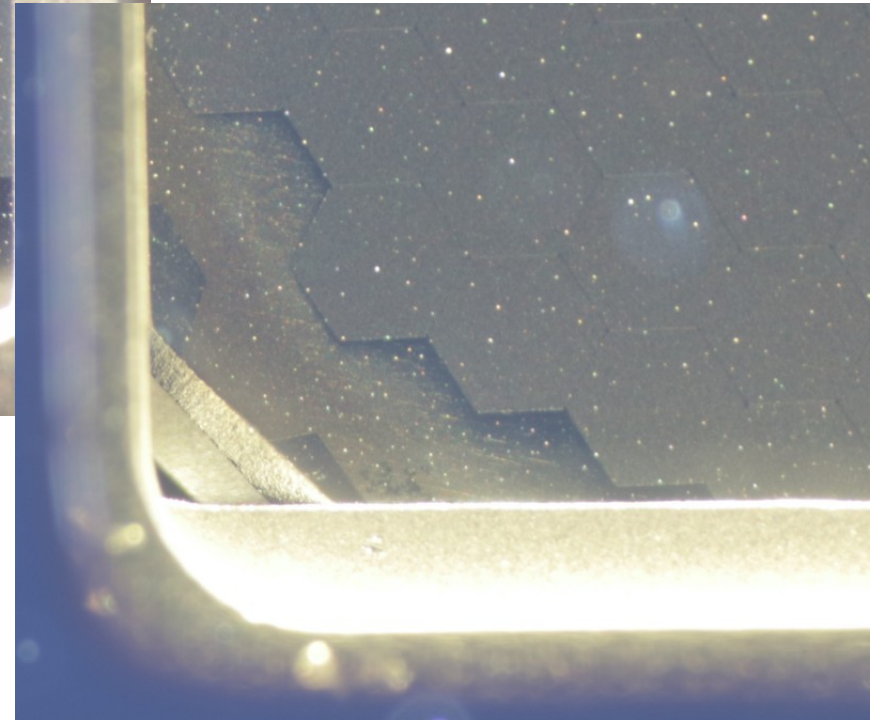
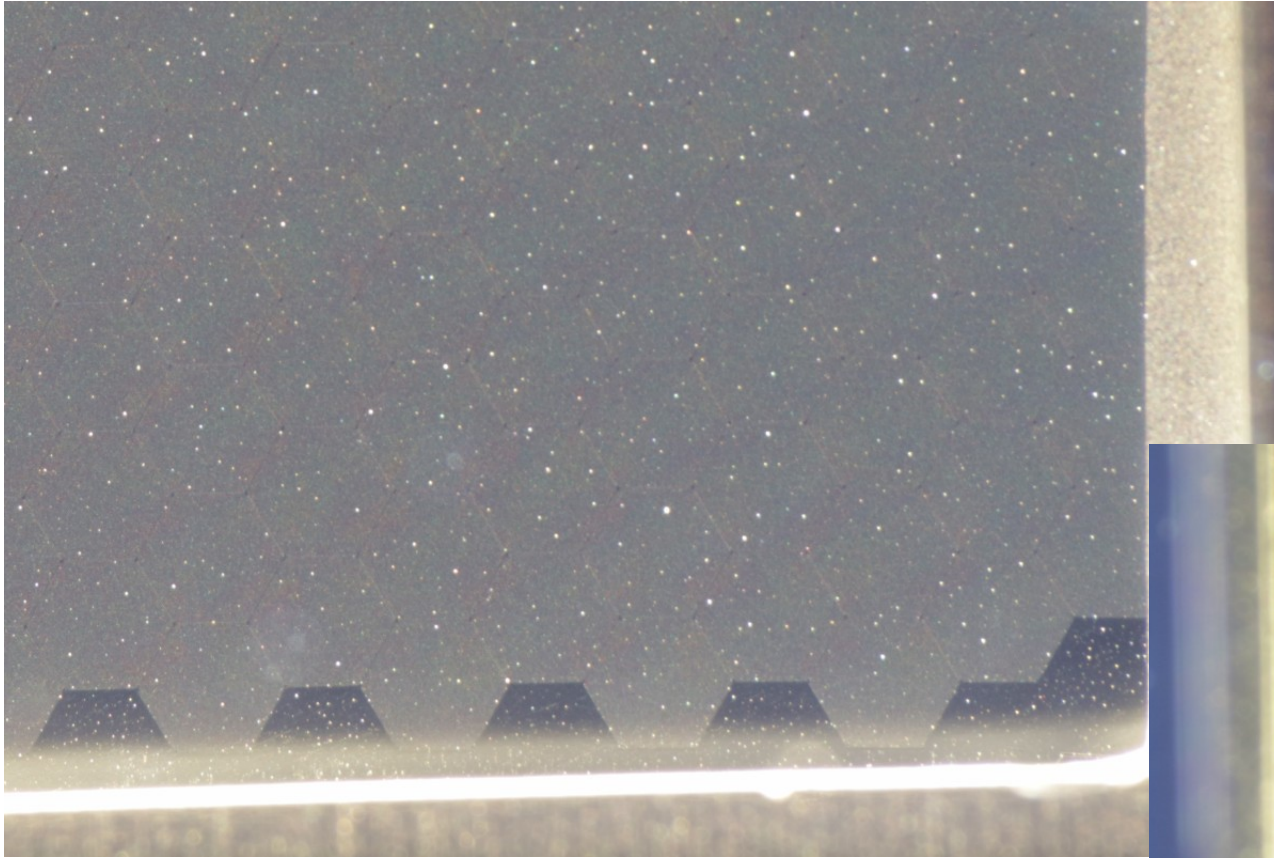
# Filaments in photocathode and 1<sup>st</sup> MCP front

---



# Further details

---



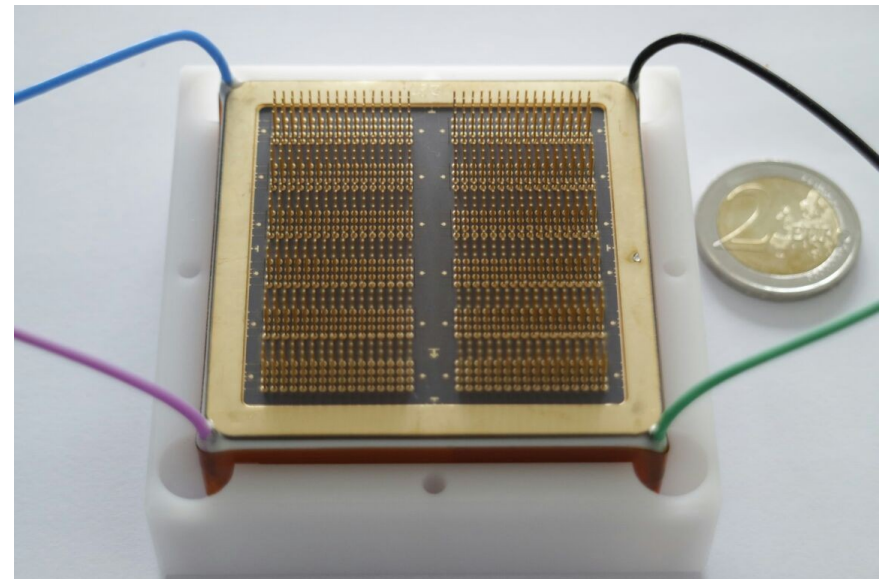
# Summary Hamamatsu YS0026

---

- White granular cover on 1<sup>st</sup> MCP front
  - one big grain casting a shadow
- Patch ~ 5x3 mm<sup>2</sup>
  - thickness fractions of  $\mu\text{m}$
  - dielectric layer – presumed metal, source unknown
  - black filaments on 1<sup>st</sup> MCP leading to rim
  - matching filaments on photo cathode
- Some minor black mark in corner

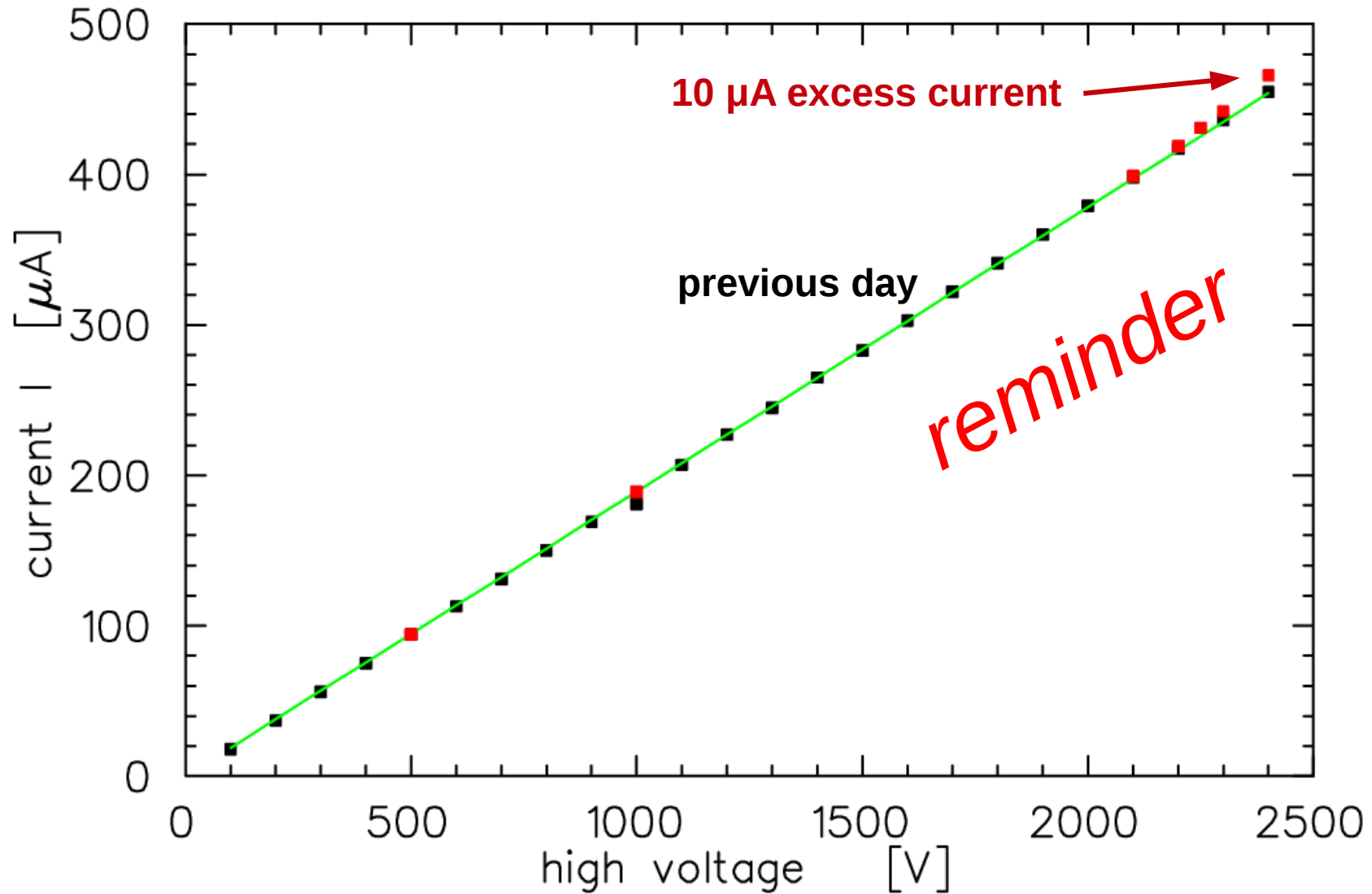
---

# Hamamatsu YH0245

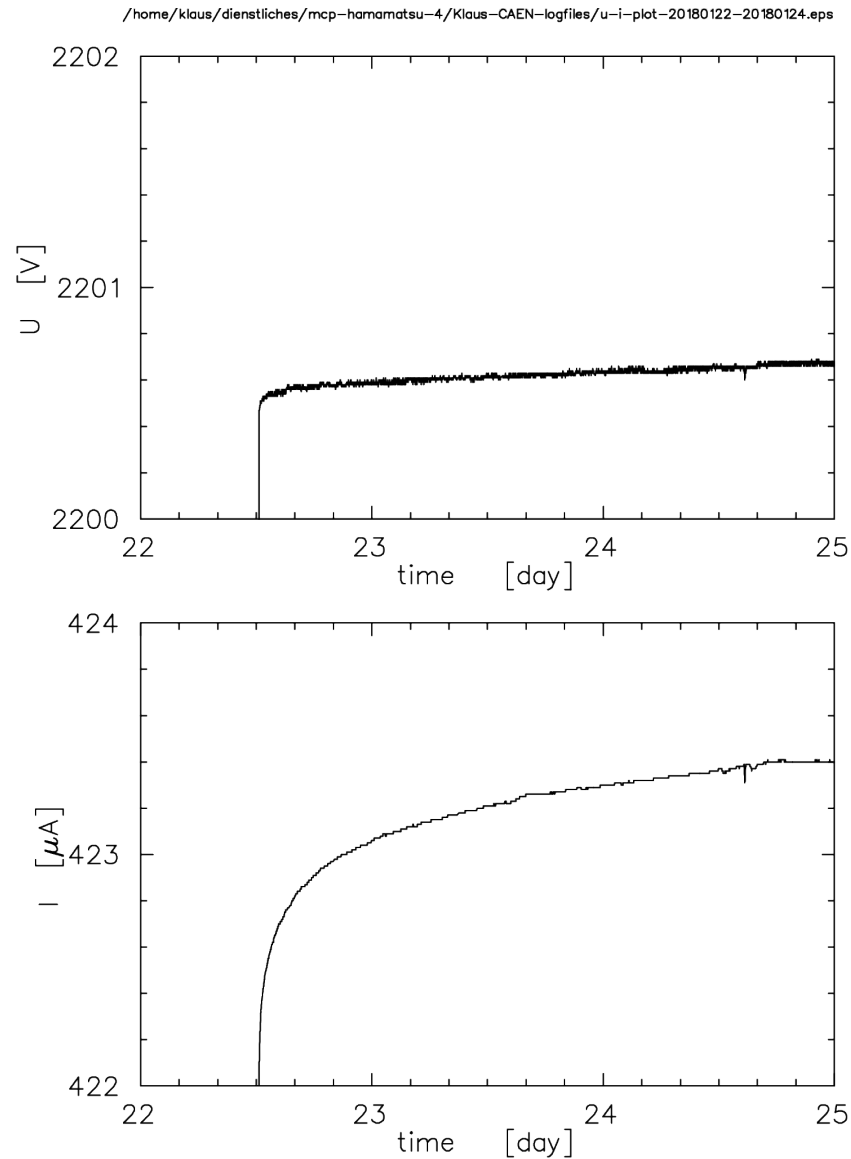


# Measured current on HV supply

reminder

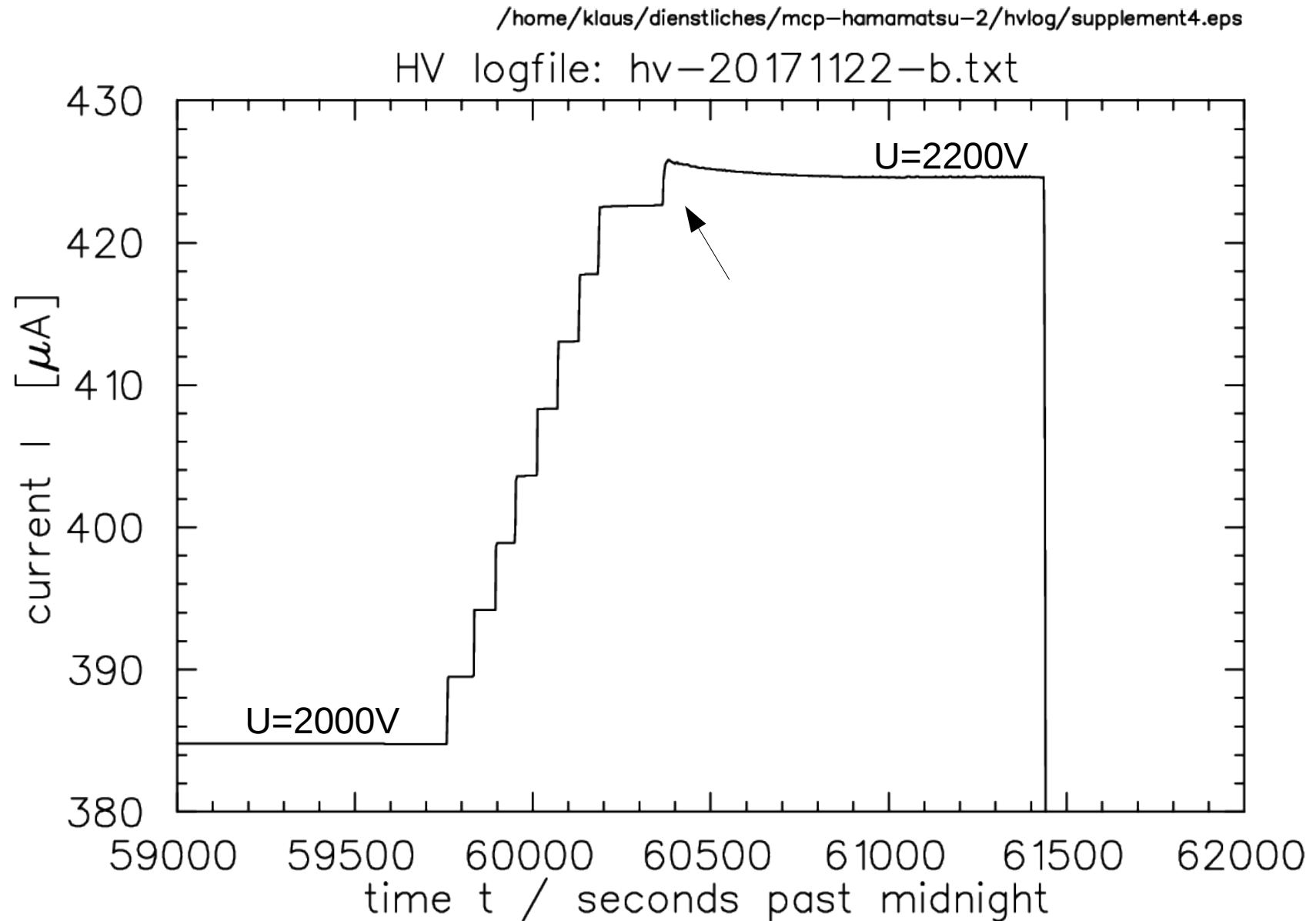


# Logging U and I

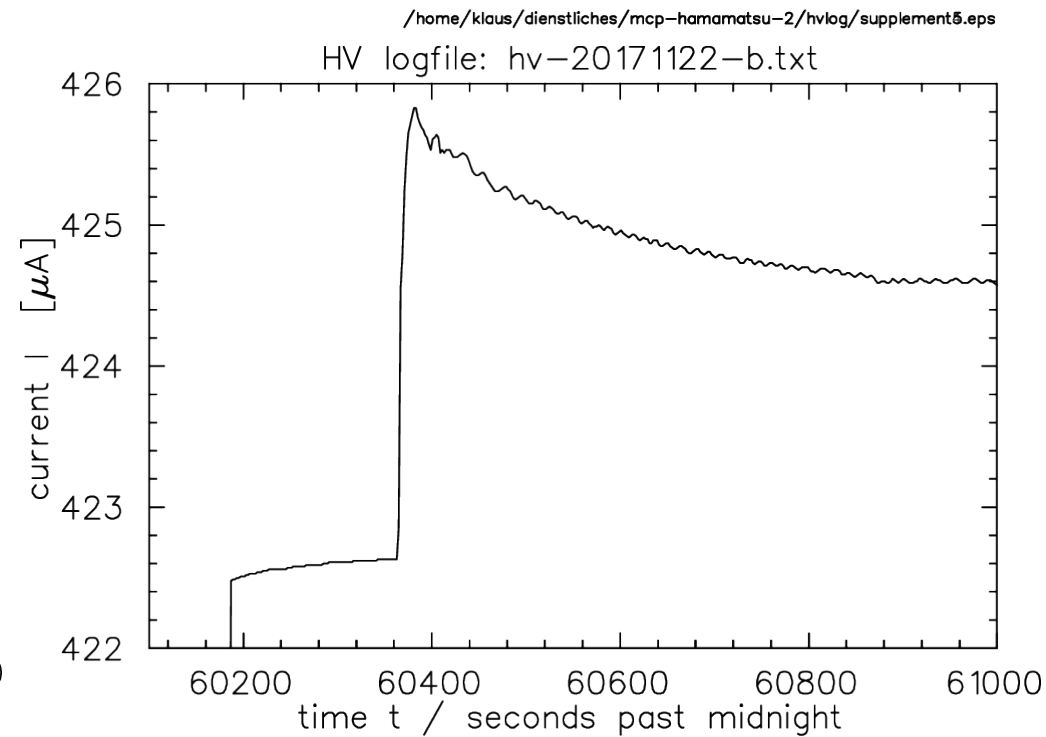
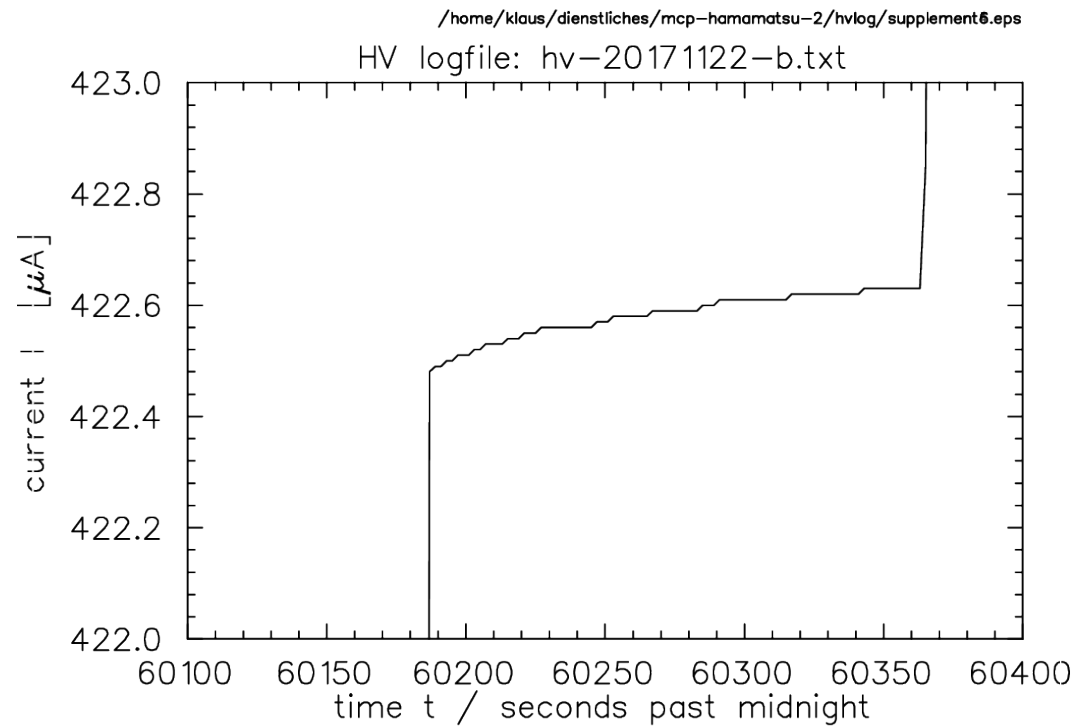




# Logging I – detail 1

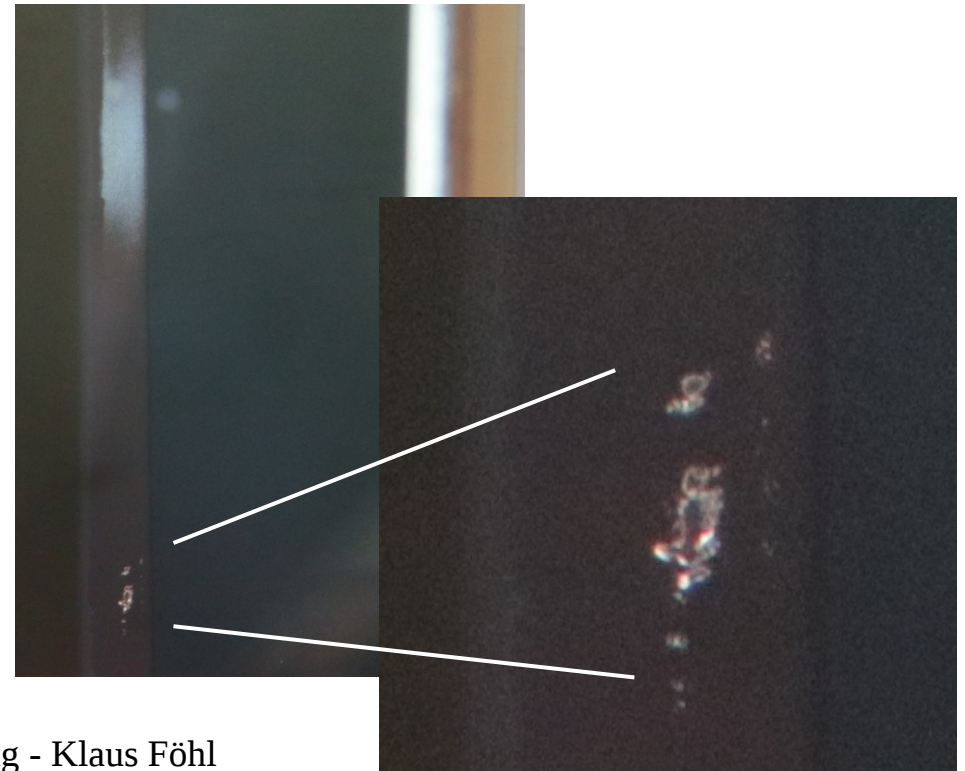
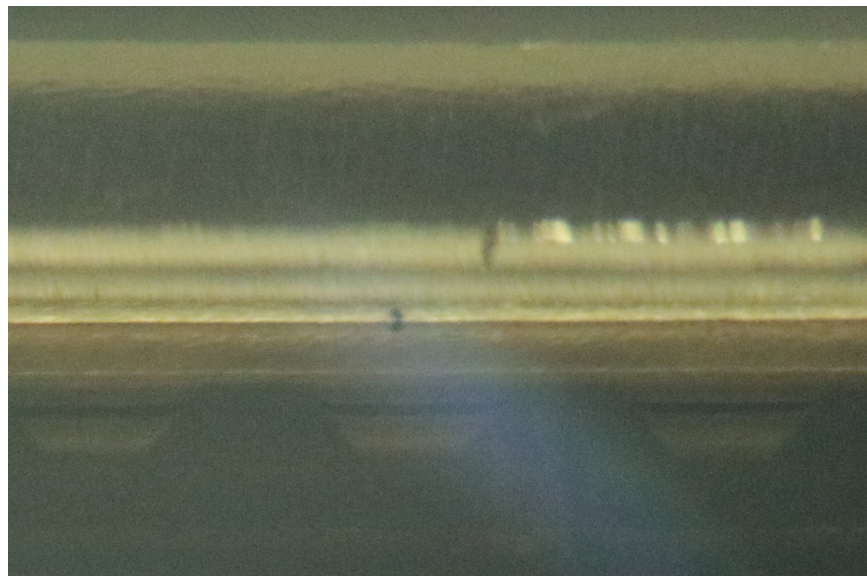
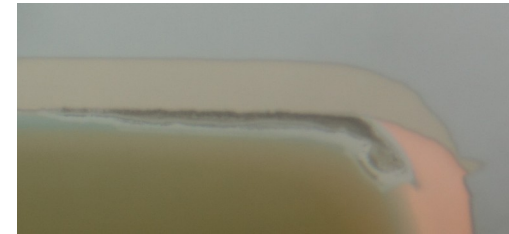
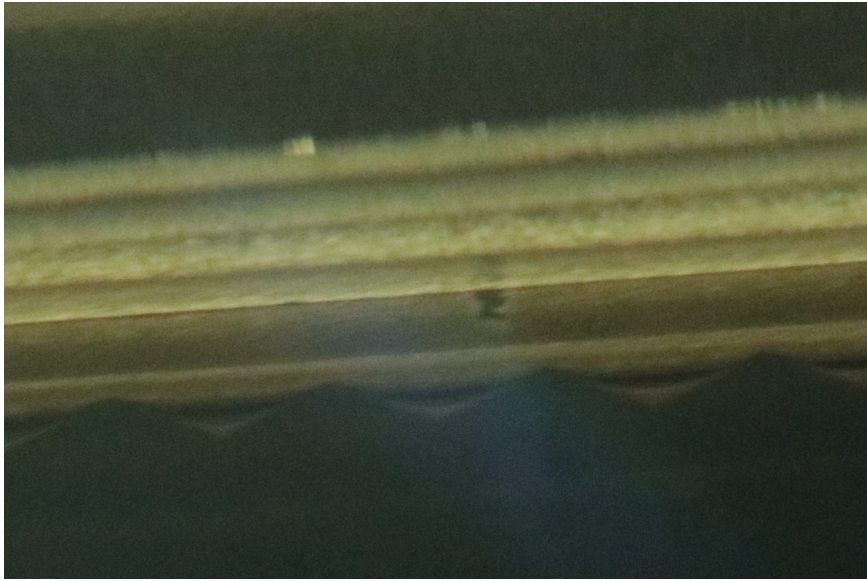


# Logging I -detail 2



# Visual inspection

---

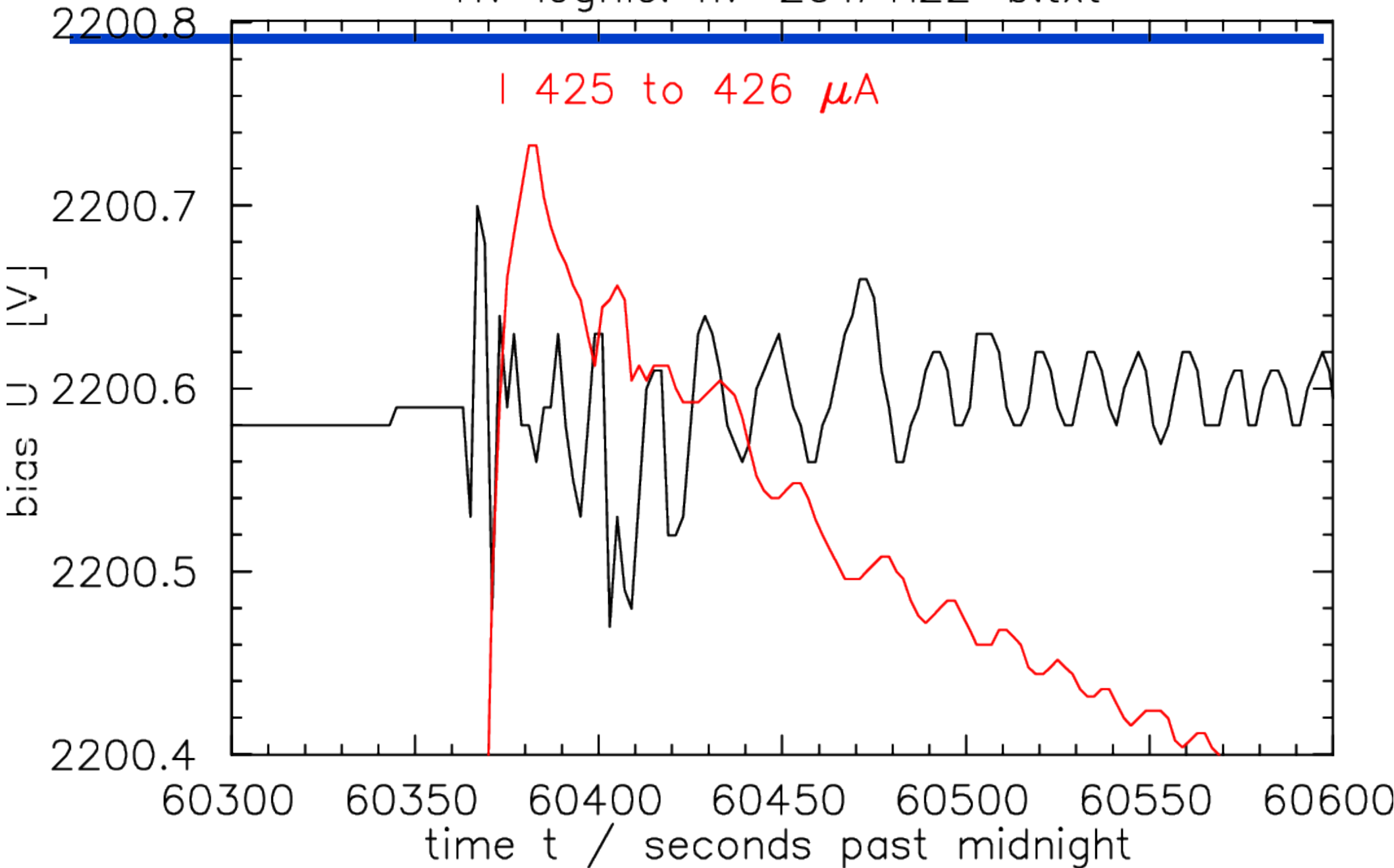


# Summary

---

- Photonis – presumed workhorse
- seen current curves – take action?
- Hamamatsu YS0026
- arcing signs, metal layer deposition
- Hamamatsu YH0245
- Logging U and I, visual inspection
- ...
- What is your experience?

HV logfile: hv-20171122-b.txt



2018-02-02 Photonis MCP-PMT

