PAUL SCHERRER INSTITUT

Initial tests of CMC-HV4

HIPA Diagnostic Upgrade

M. Sapinski, PSI, Dec 19, 2023

Introduction

- I received from Markus two CMC-HV4 prototype cards mounted on development boards which provide power and ethernet. He also gave me python program to communicate with them (setting and reading back high voltage values).
- A mobile VME crate was assembled by Silas, Raphael, Hubert and Kurt for emittance meter.
- On Dec 13 we borrowed this crate and moved it to the cellar next to electronics racks. Raphael installed LogIV 4x4, Hubert configured it, data saved to archiver (5 Hz? Why not 10 Hz?).
- That day and the next night we took data from MRI9B (Ionisation Chamber in the Ring) and another, test ionisation chamber (TST) with a battery to simulate injected current.
- Mobile crate was returned to Silas on Dec 14th.

Pictures of the setup

Initially

we had wrong

grounding and

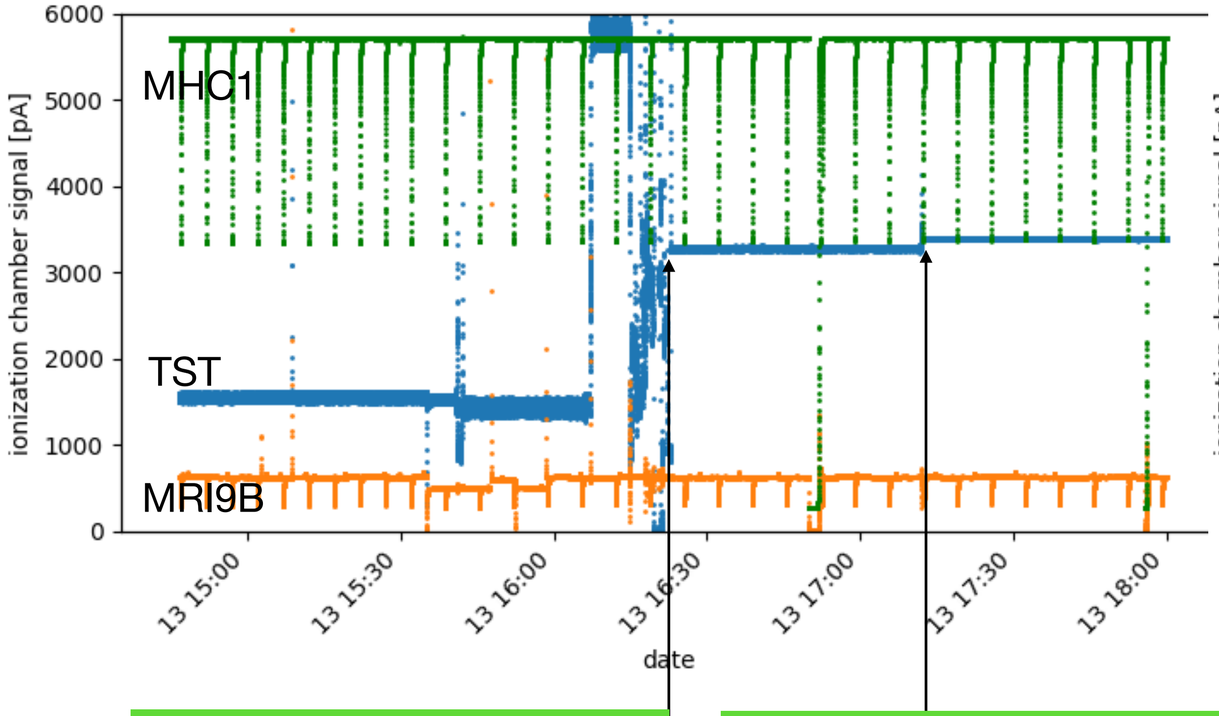
seen 0.5 Hz

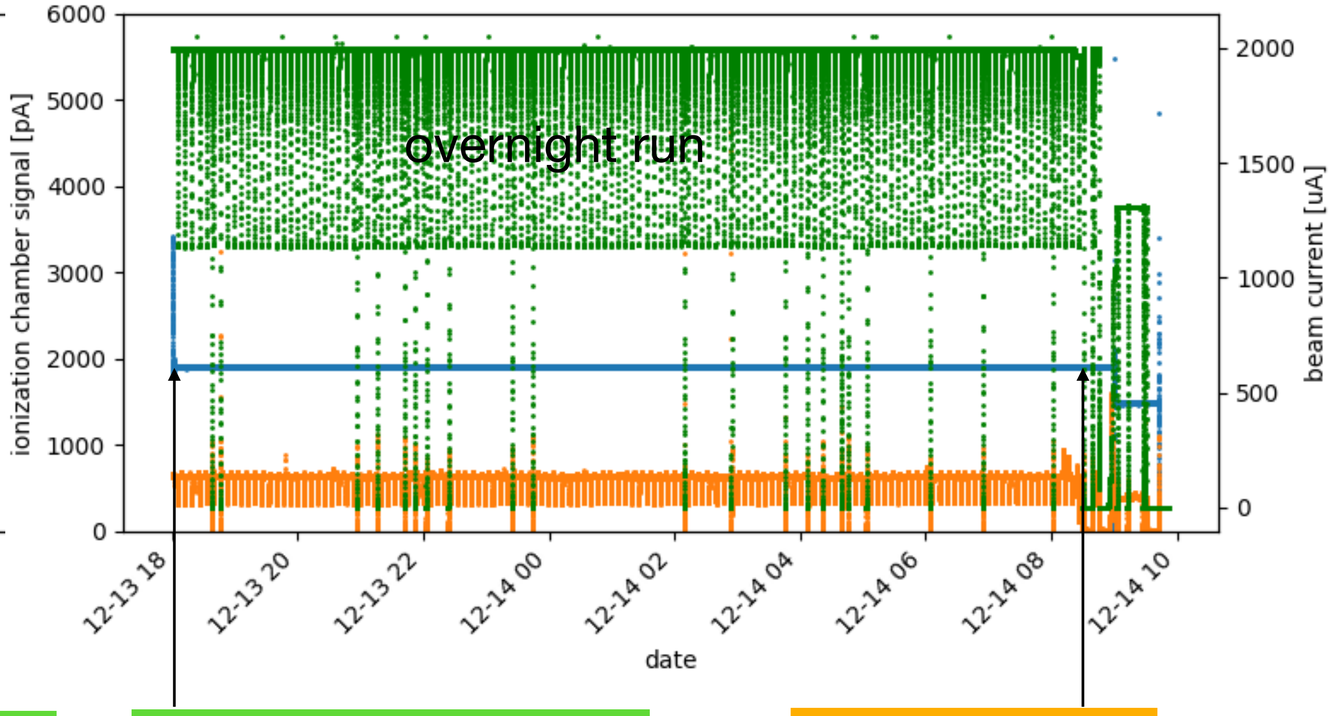
oscillations

of the signal.

Data
- overview

MRI9B sees UCN kicks





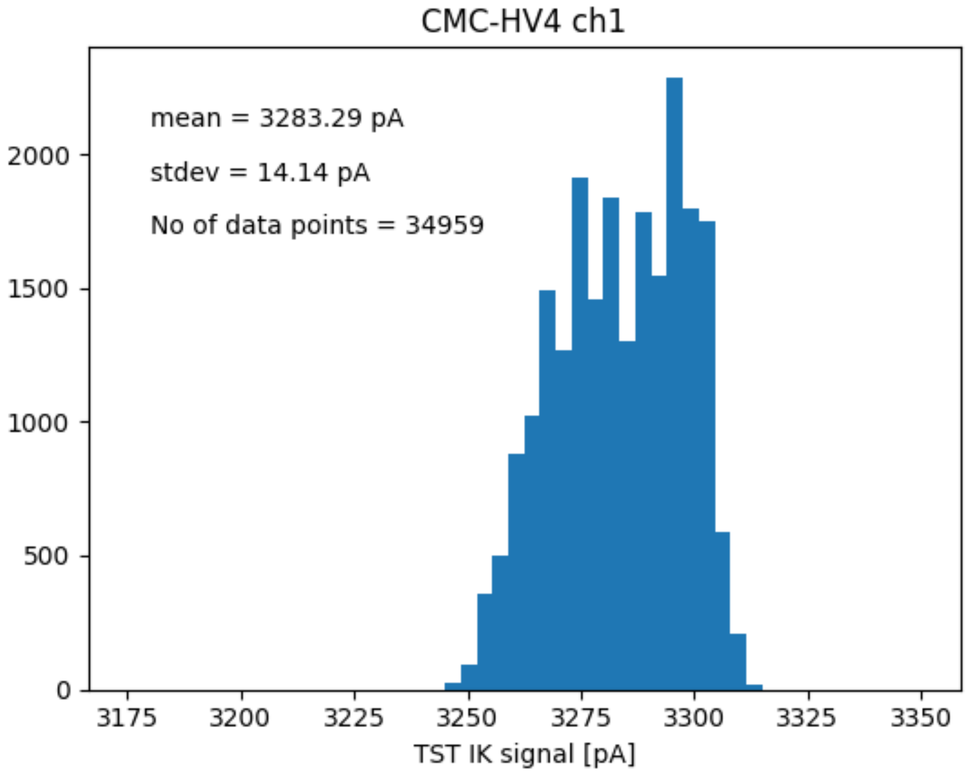
Grounding problem solved
TST to CMC-HV4 ch1
MRI9B to HV300

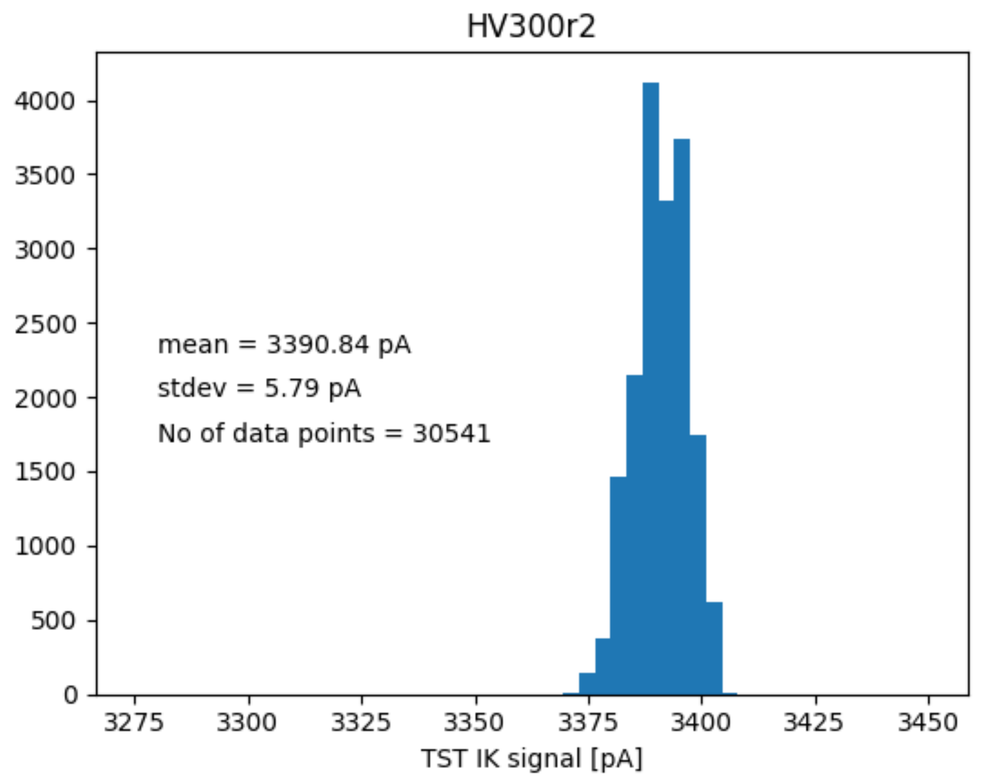
TST to HV300 - why jump?
MRI9B to CMC-HV4 ch1

TST to CMC-HV4 ch2
Injected current decrease
MRI9B as before

Strahlentwicklung beginnt

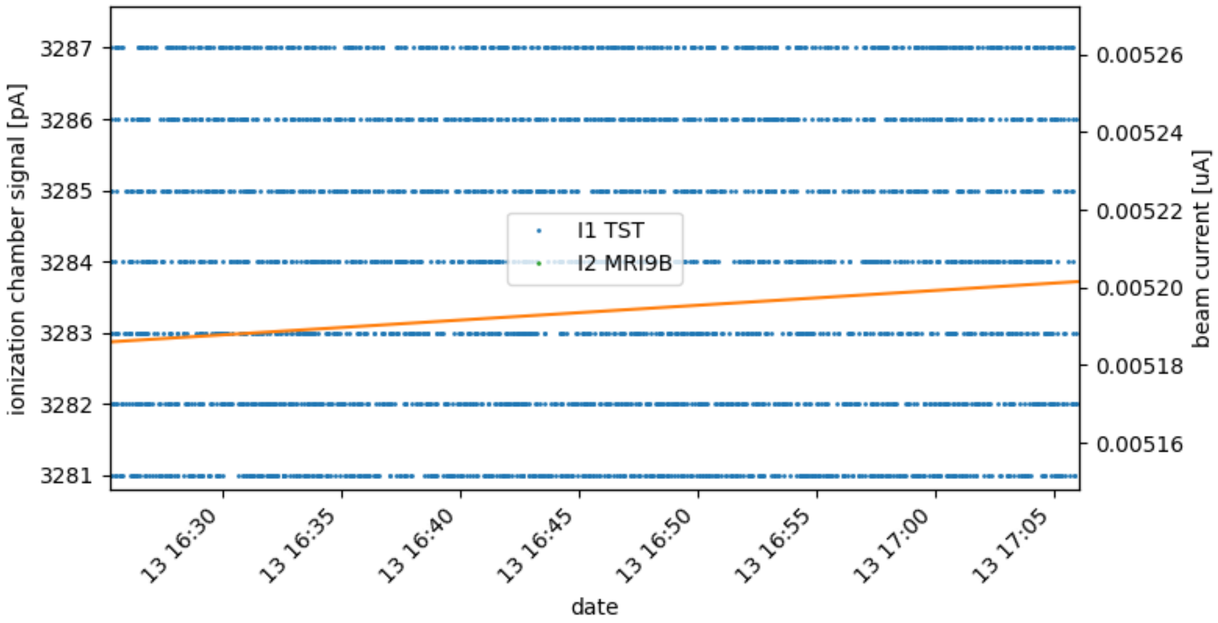
TST channel

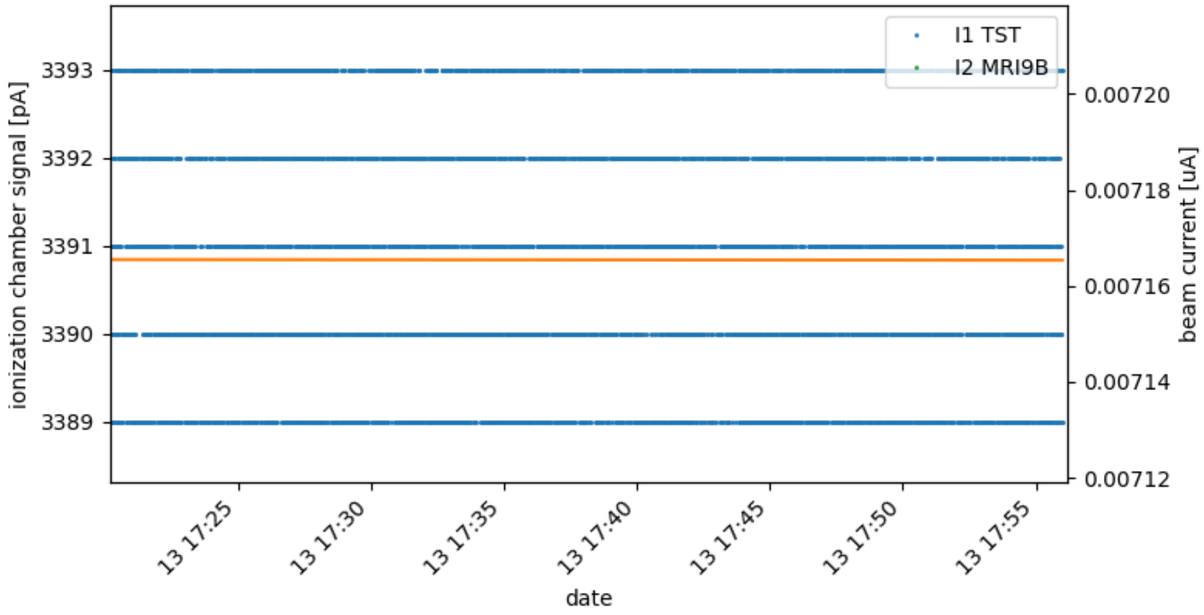




- Under old the chamber signal has less spread
- What is this spread? A trend? A noise? Or simply a “jump” in source current?

TST channel: trend





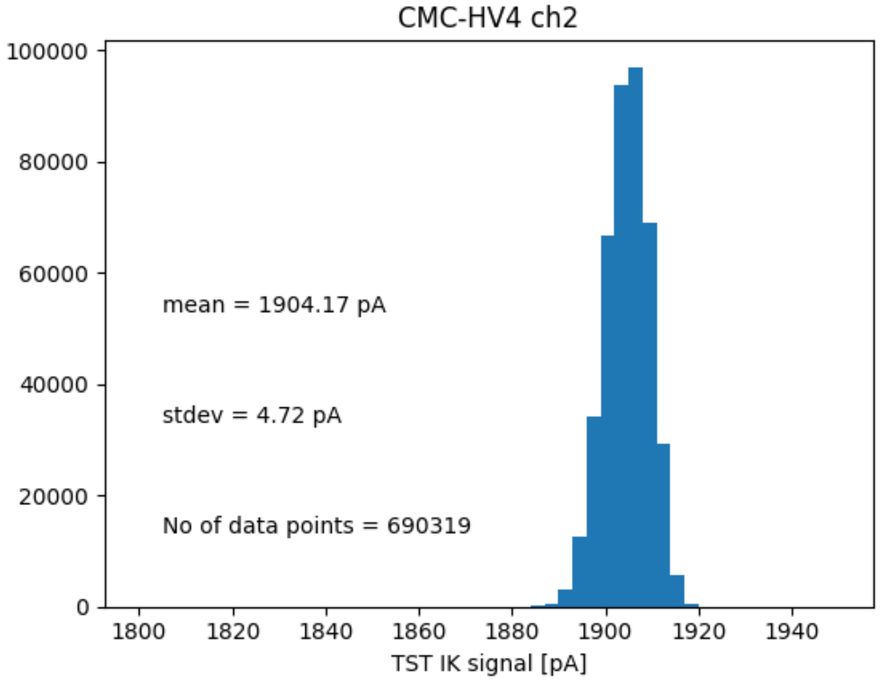
3.5*E-4 pA/s

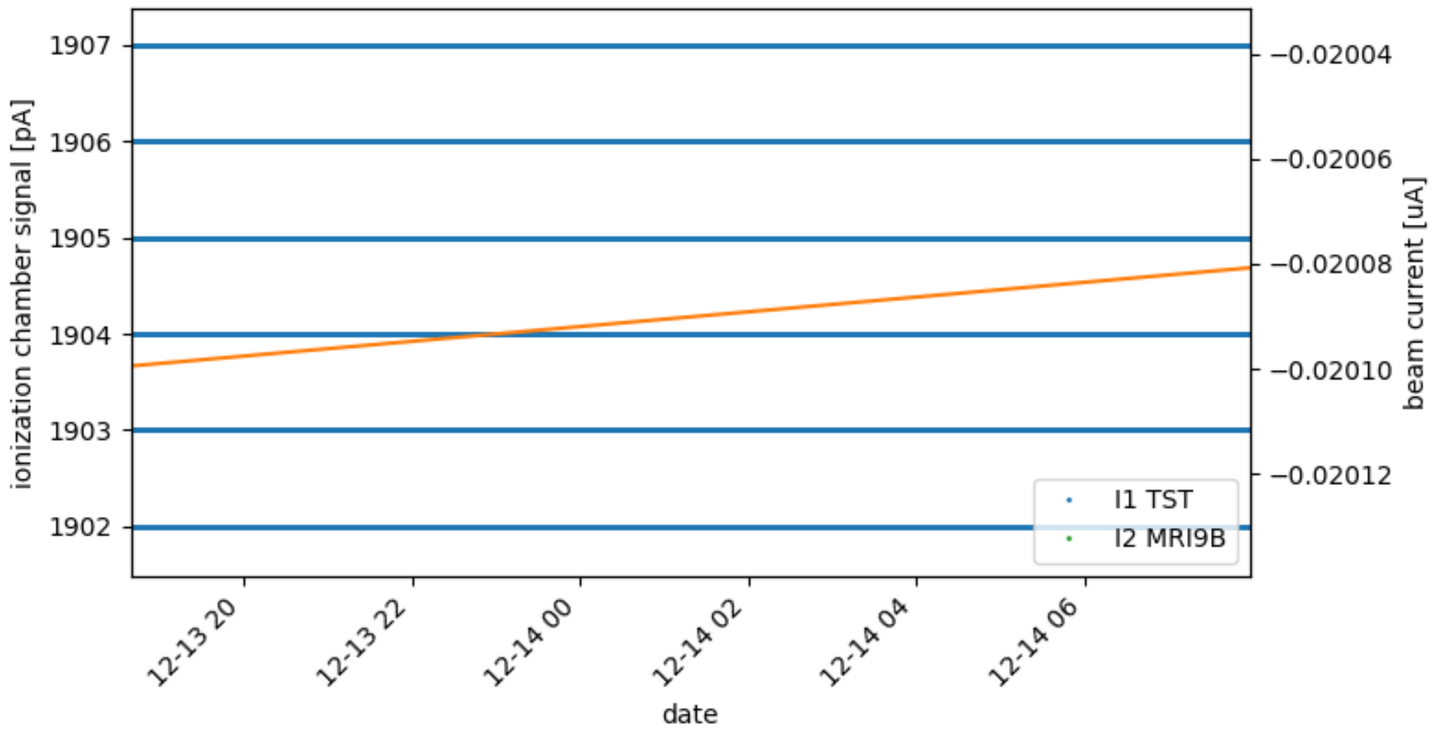
Battery drift?

-3*E-6 pA/s

TST during overnight run

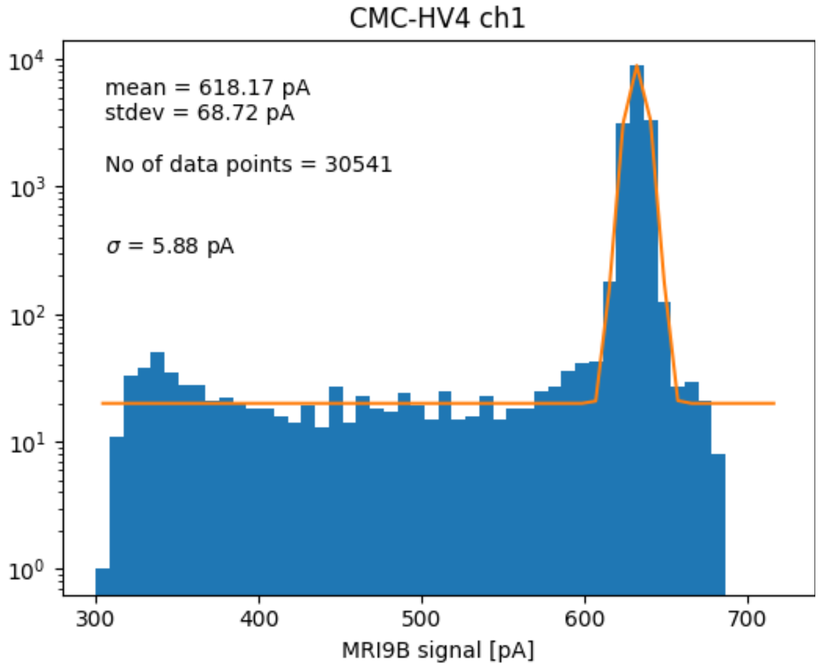
- Is channel 2 somehow better than channel 1?

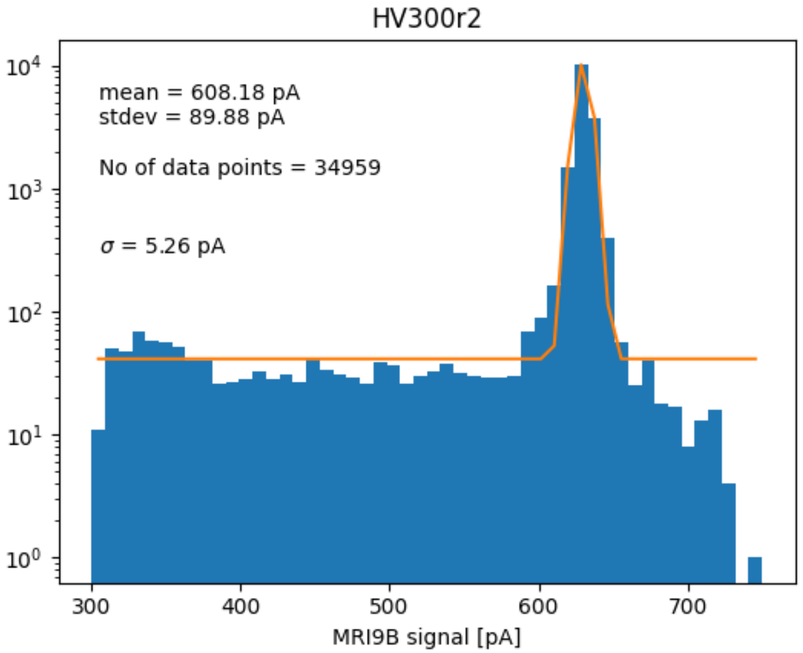


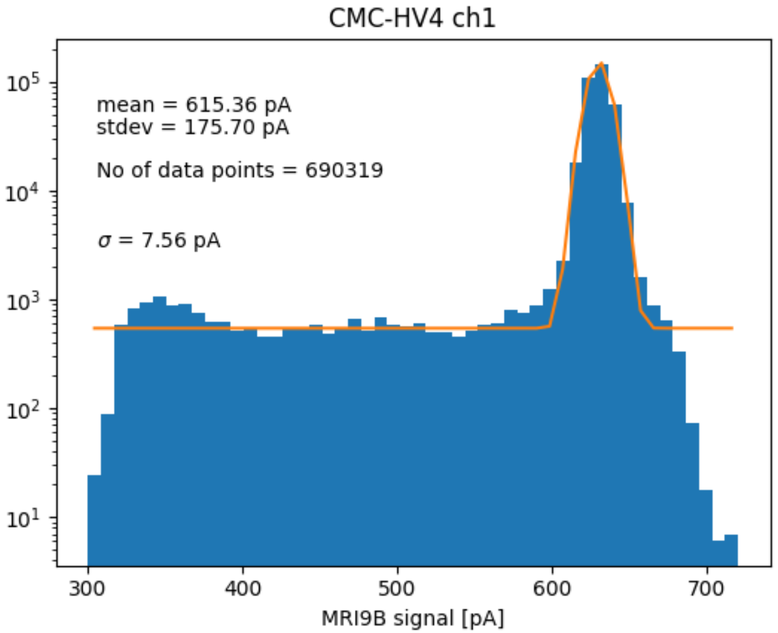


2.1E-5 pA/s

MRI9B data



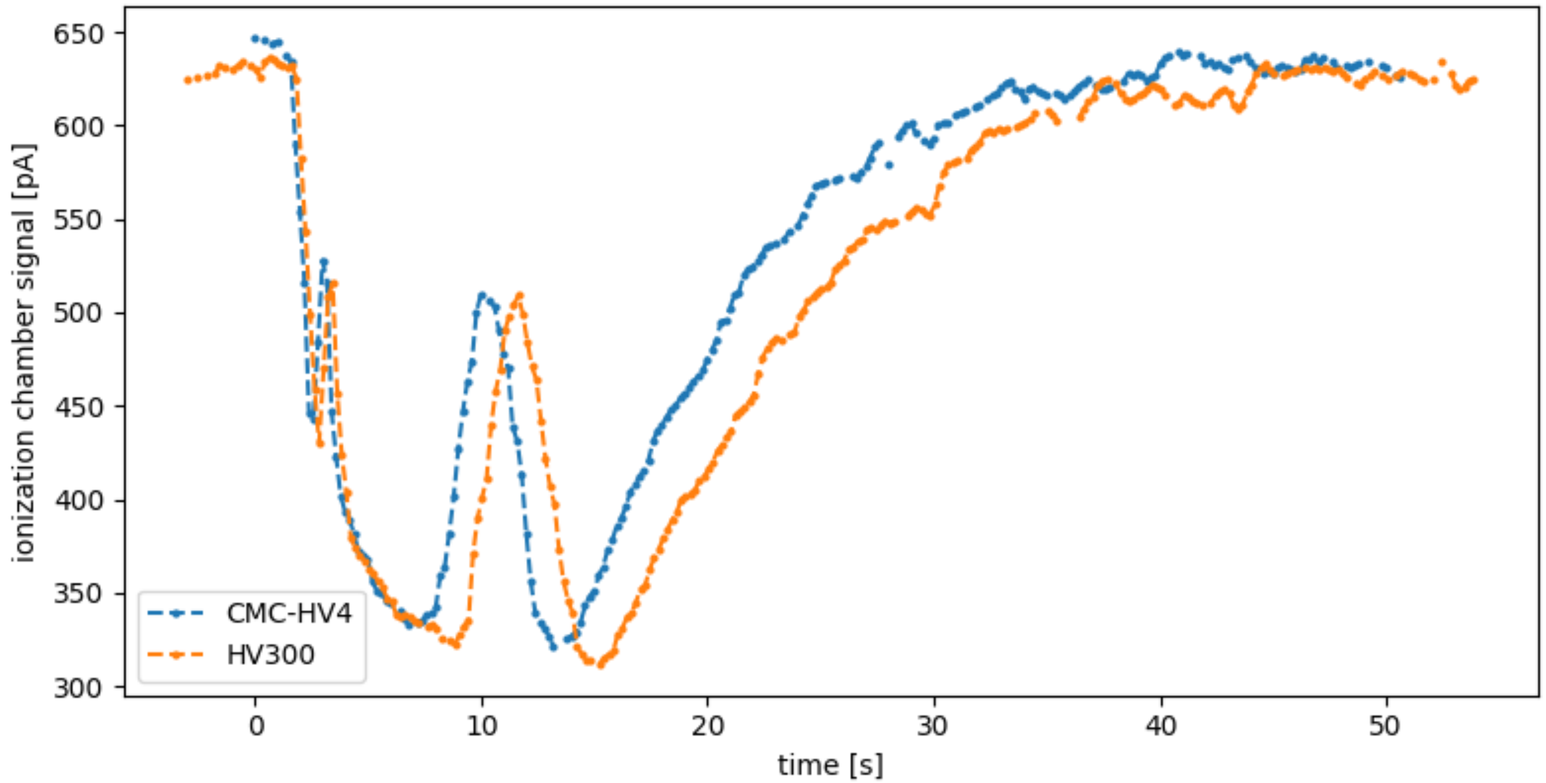




- HV300r2 and CMC-HV4 give similar stability of the operational ionisation chamber signals.

Comparison of kicks

- Two kicks selected arbitrarily
- Is CMC really faster?



Next steps

- What else can we extract from this data?
- Shall we do more measurements (with battery, no beam).
- Markus is away until February, we should have test results by then.
- Silas crate is available.
- If yes, what shall we be looking at? Long-term stability? Maybe not obvious with battery, maybe we should use harmonic signal?