

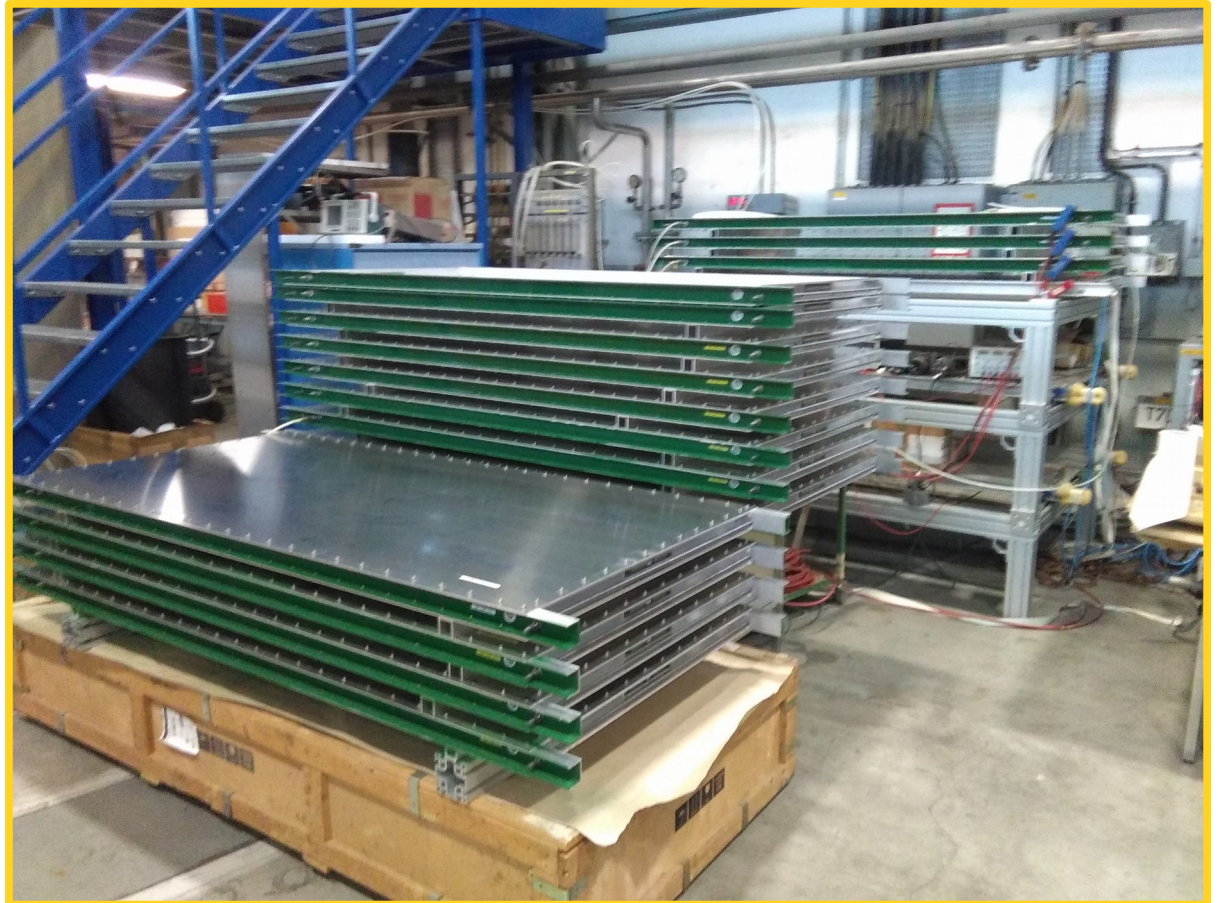
MRPCs:
construction and tests

AM 2017 05 10

13 MRPCs already built
2 in construction + 6 by July

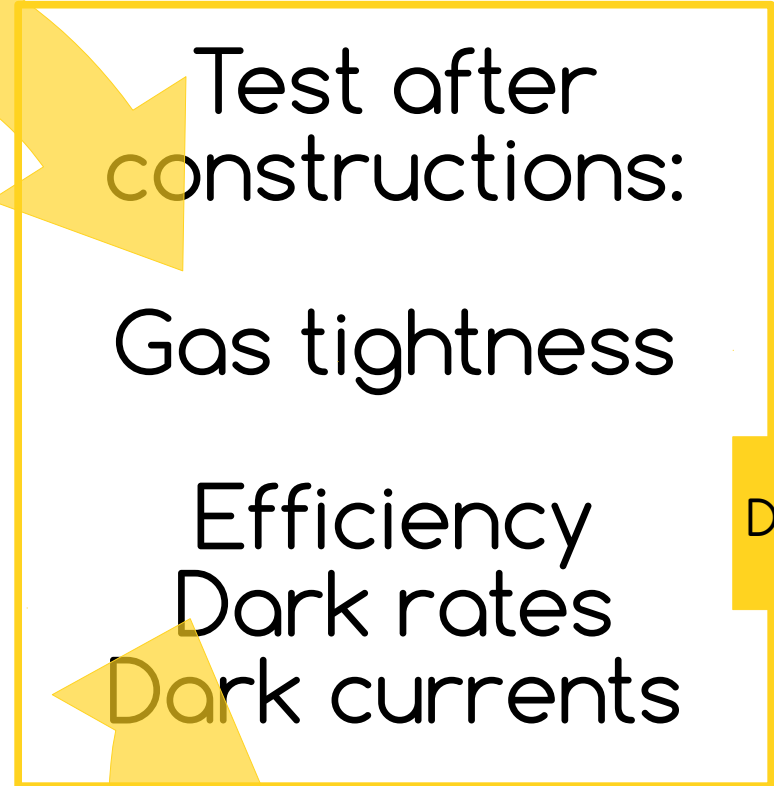
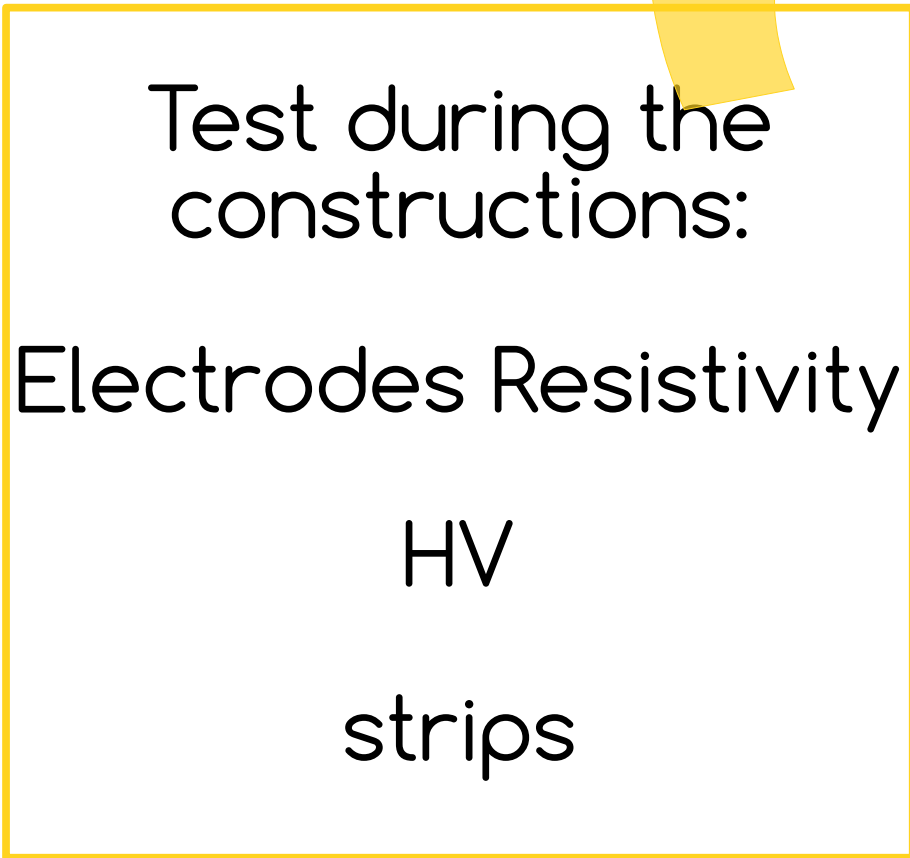
20170222001 LAMP-01
20170223002 LAMP-01
20170225003 LAMP-01
20170314004 GENO-01
20170316005 GENO-01
20170317006 GENO-01
20170405007 SIEN-02
20170406008 SIEN-02
20170407009 SIEN-02
20170425010 CARI-01
20170426011 CARI-01
20170427012 CARI-01
20170509013 TORI-05
20170510014 TORI-05
20170511015 TORI-05

+ 3 LODI-03 + 3 CAGL-04



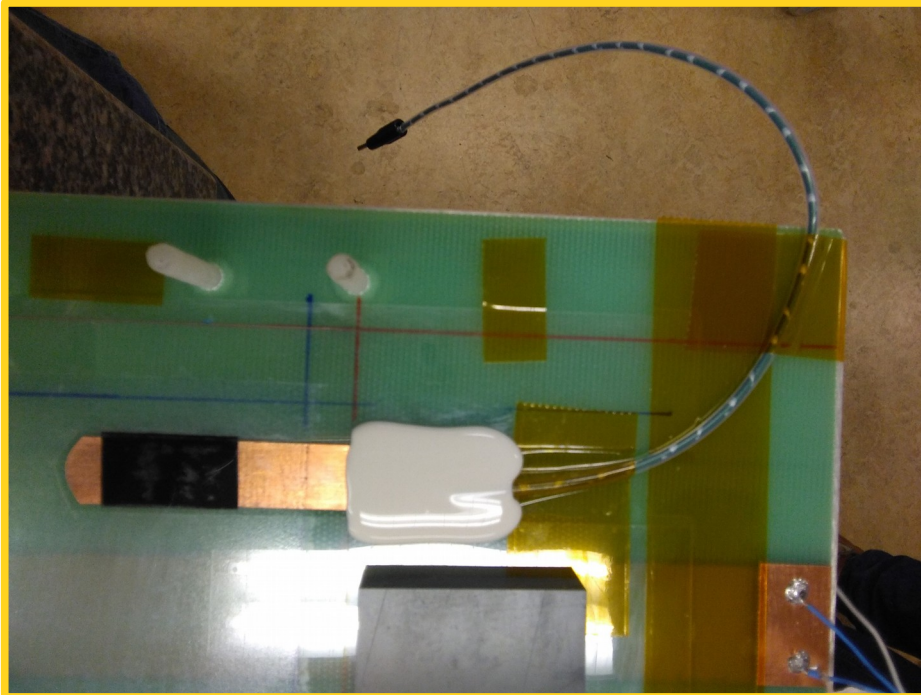
All of them 6 gaps 250 um + 5 glasses 280 um.
Note the green band to identify (Roman)

Tests flow



If any problem

Tests during the constructions



HV

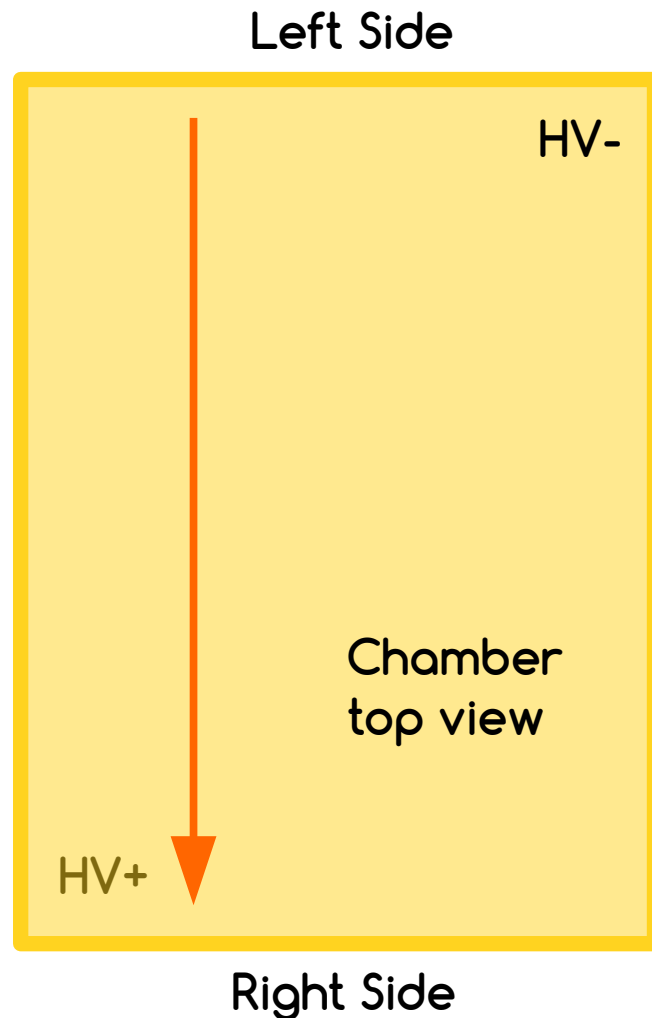
The good quality of HV contact on electrodes is ensured by **carbon tape** (black) between contact and glass.

The **upper electrode is the negative.**

The electrodes are **properly labeled** for avoiding mistakes during the telescope installation



A proposal for a standard telescope axis definition



We could define
as the **Standard**
for telescopes orientation

the **LEFT**
on the **negative HV side**
and the **RIGHT**
on the positive

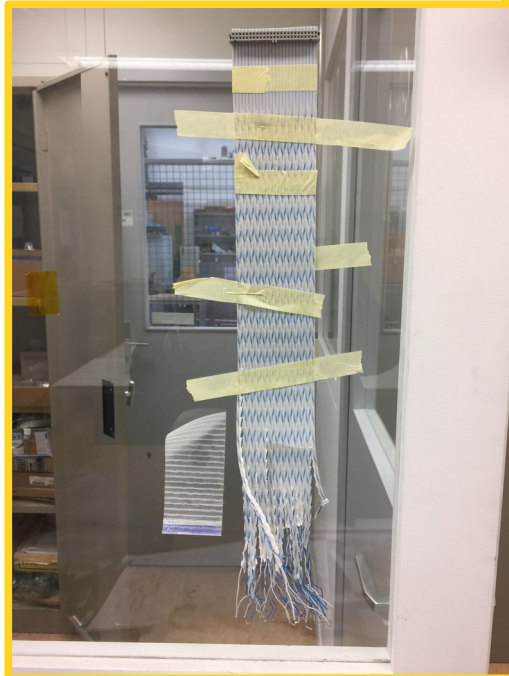
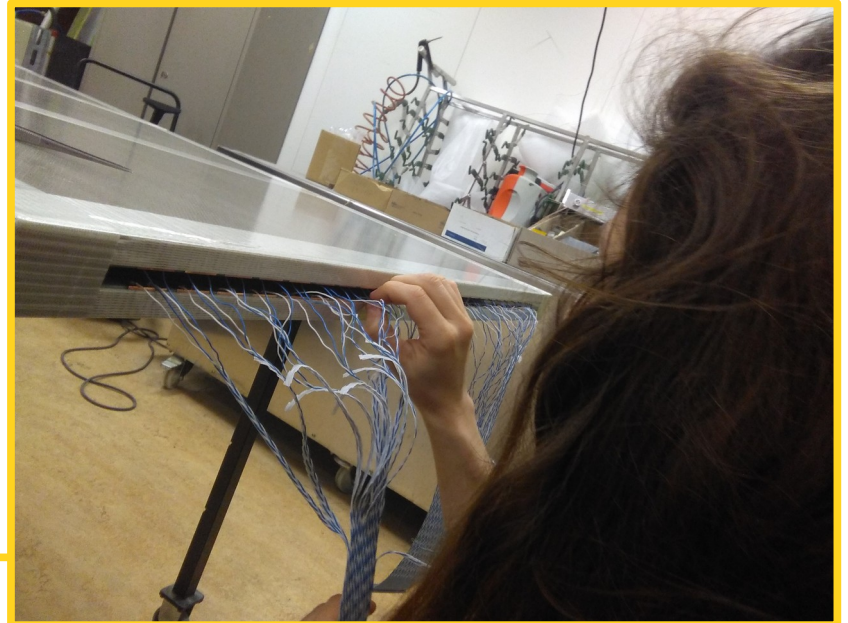
giving the axis as in the
sketch.

Tests during the constructions

Flat cables are prepared in advance.

Right orientation is taught and checked during soldering.

Unused twisted pair are tied.



Strips

Solderings are checked both for

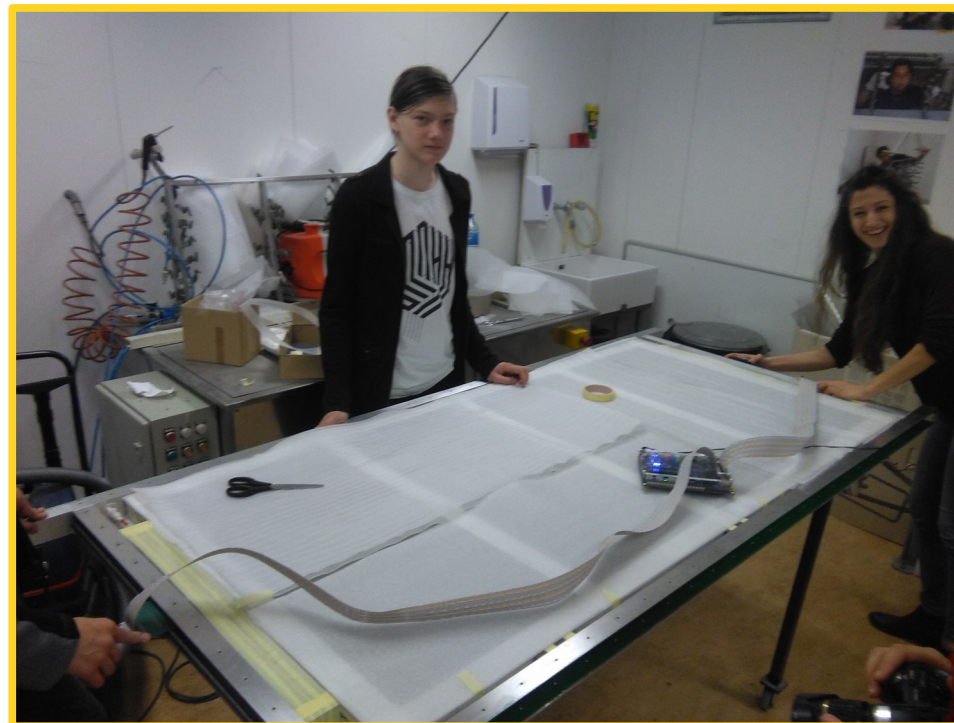
1. **mechanical strength**
2. **right order**

several times and by different people

Tests during the constructions

Good electrical connections are tested by Bossini's Box on both sides.
The test is repeated:

1. with dummy connectors before closing the chamber
2. after laying the chamber within the chassis
3. after chassis closing

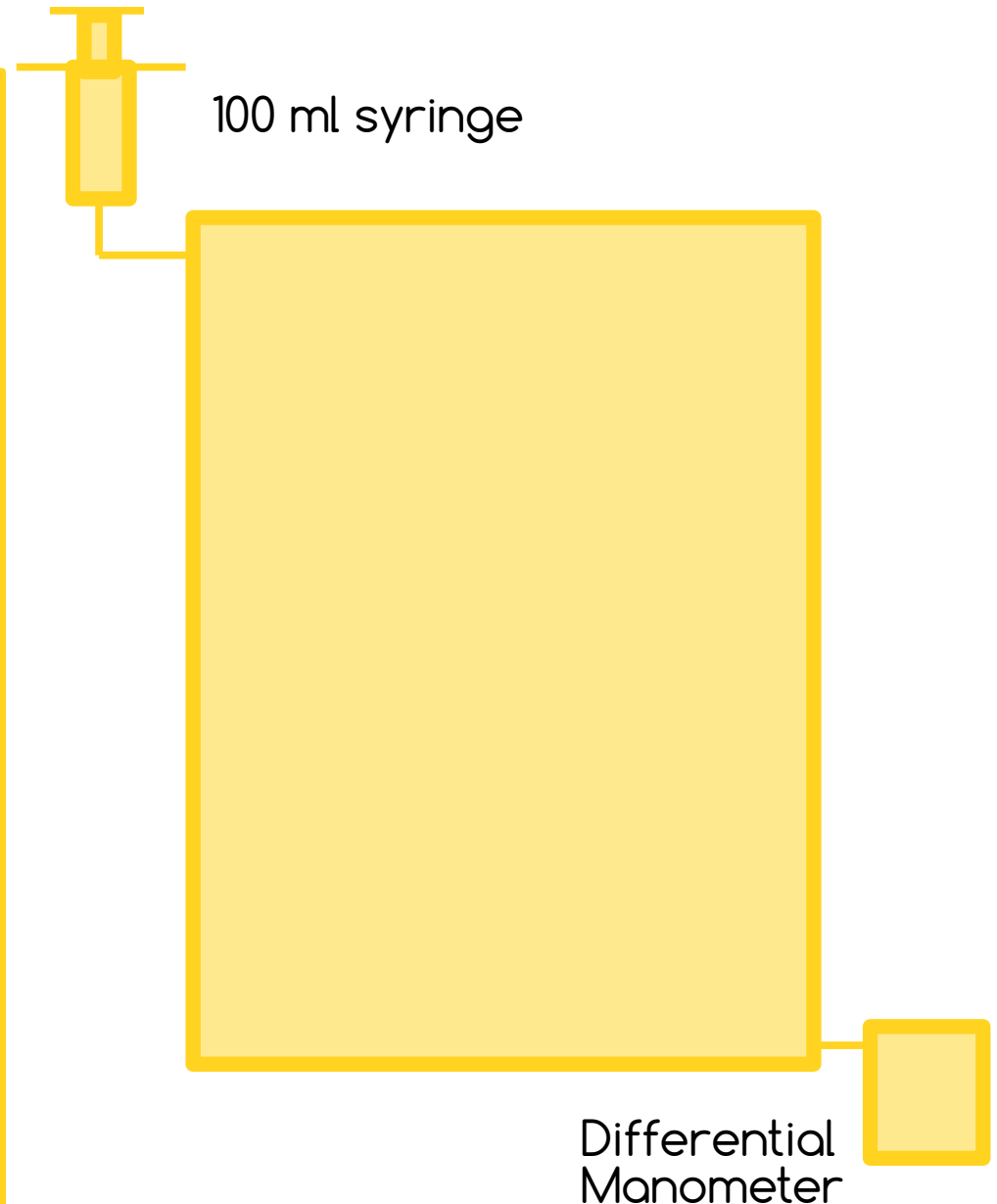


Strips

Gas tightness tests

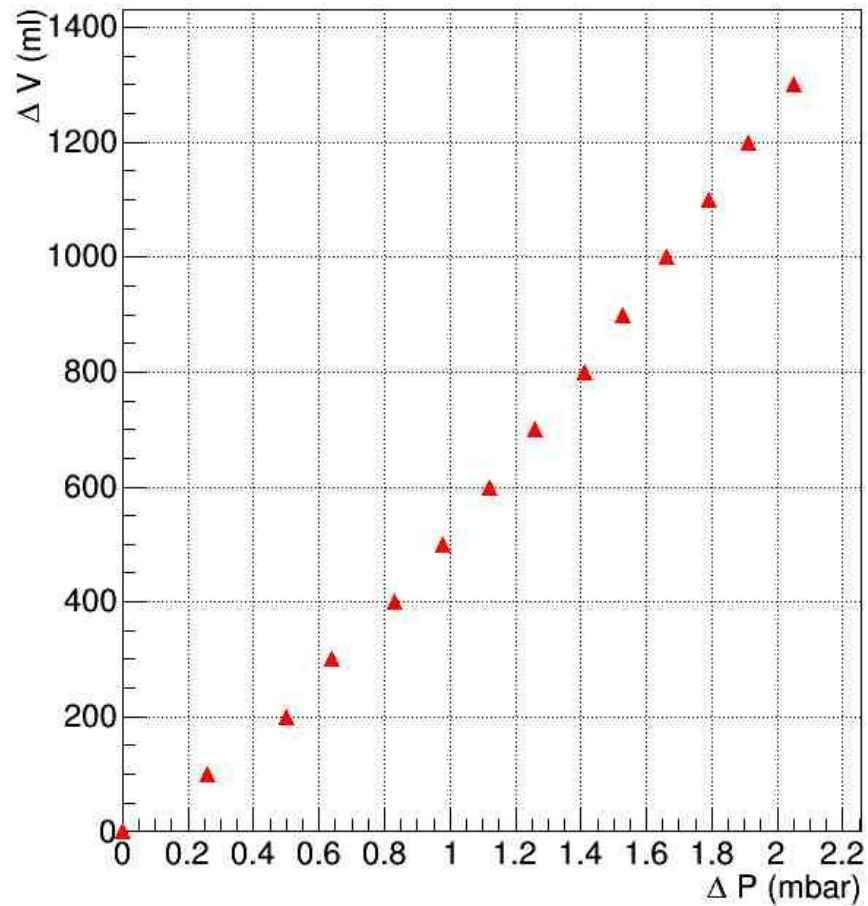
The gas tightness test is performed as follows:

1. 100 ml of air are injected during each step up to 2 mbar of overpressure
2. Volume vs Pressure curve is measured
3. the chamber is closed and the Pressure variation vs time is measured
4. corrections for volume variation due to Temperature are applied
5. the volume time derivative is the estimated leakage

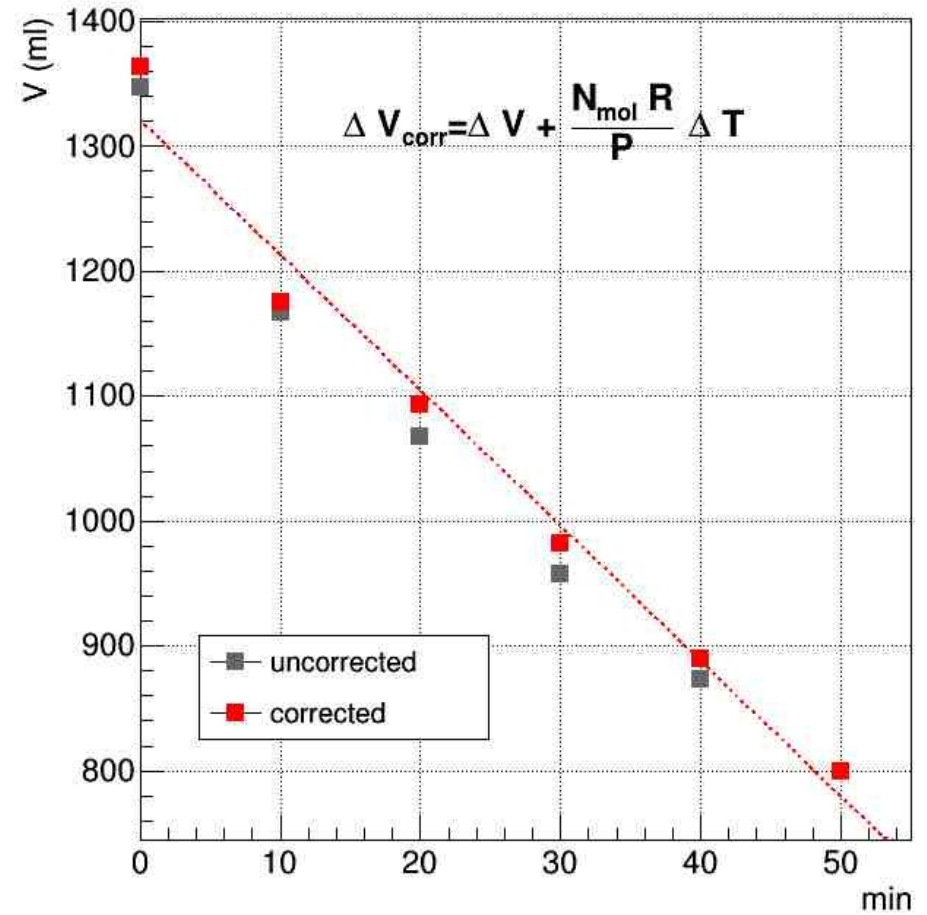


Gas tightness tests

Calibration curve

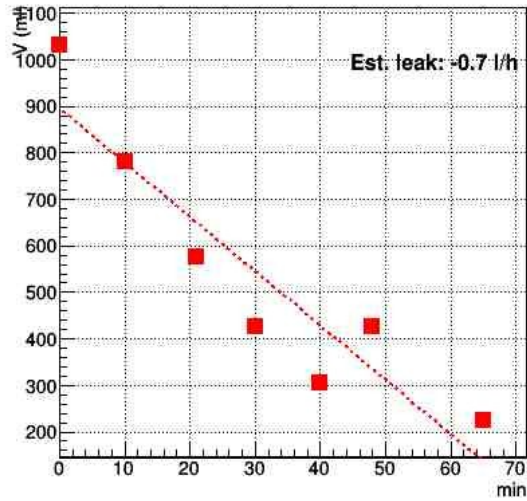


Temperature correction

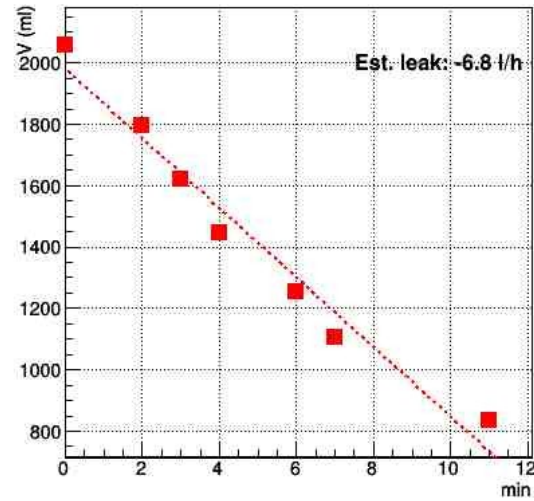


Gas tightness tests

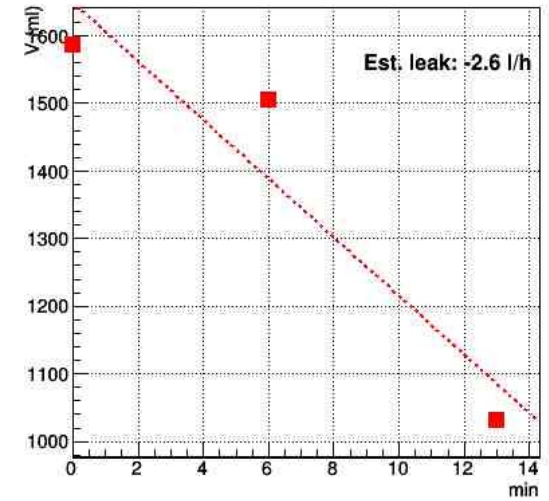
20170222001 gas tightness



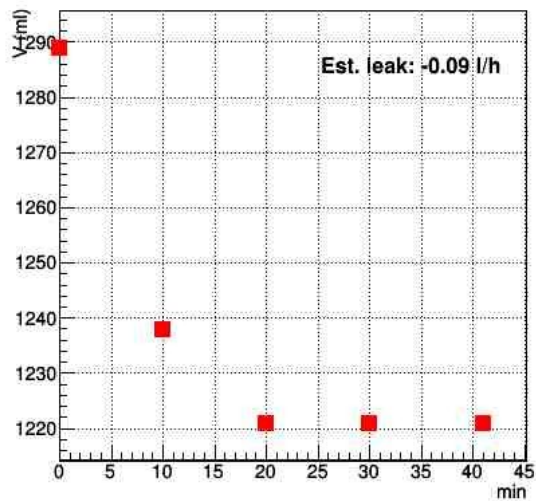
20170223002 gas tightness



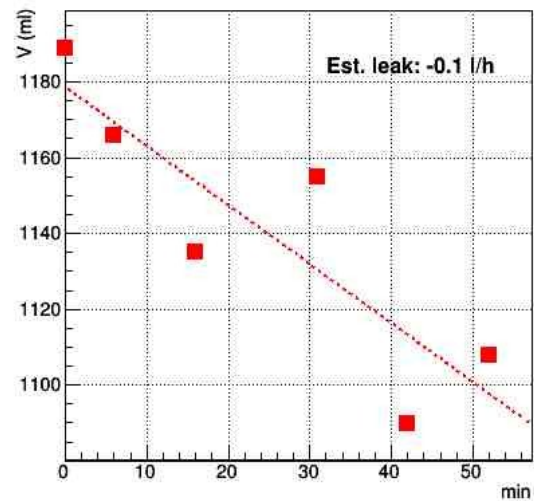
20170225003 gas tightness



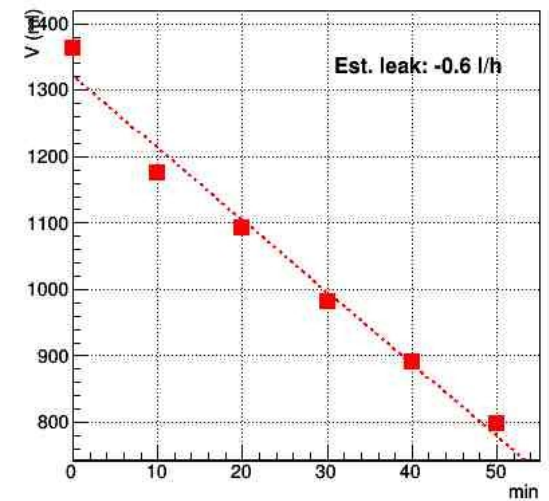
20170314004 gas tightness



20170316005 gas tightness

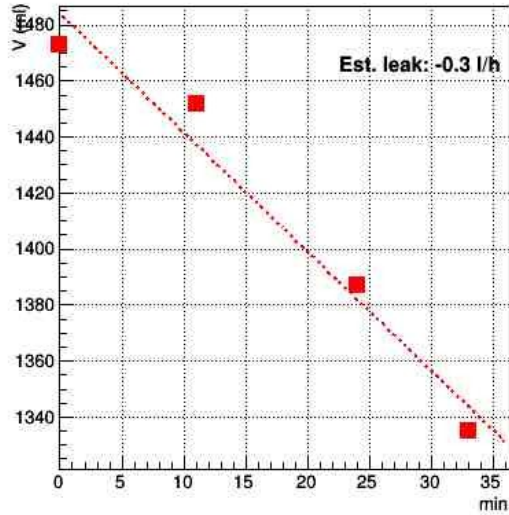


201703017006 gas tightness

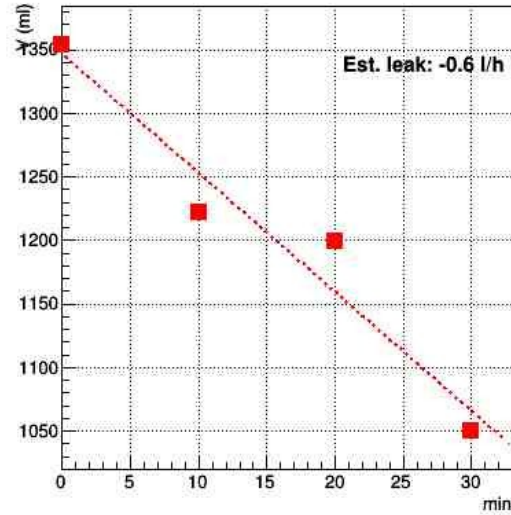


Gas tightness tests

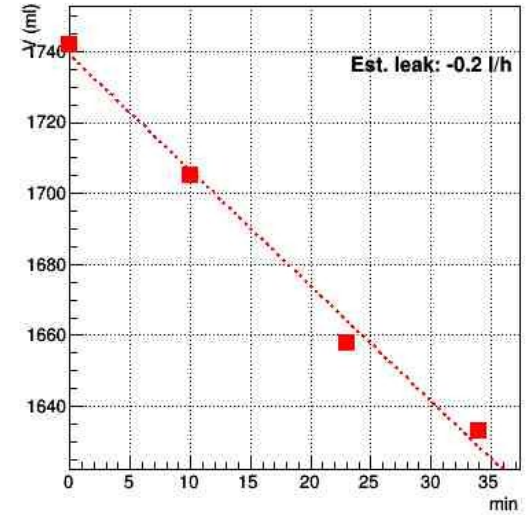
20170405007 gas tightness



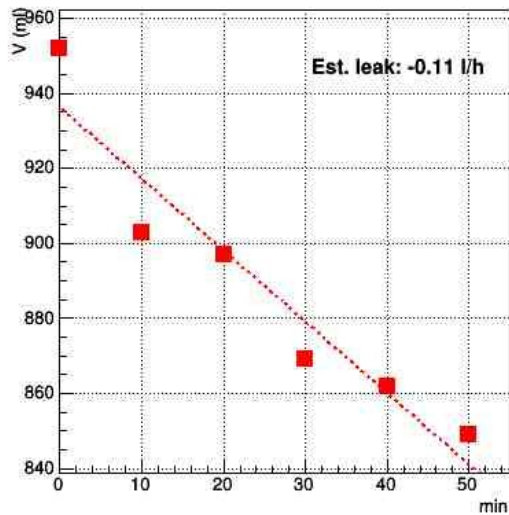
20170406008 gas tightness



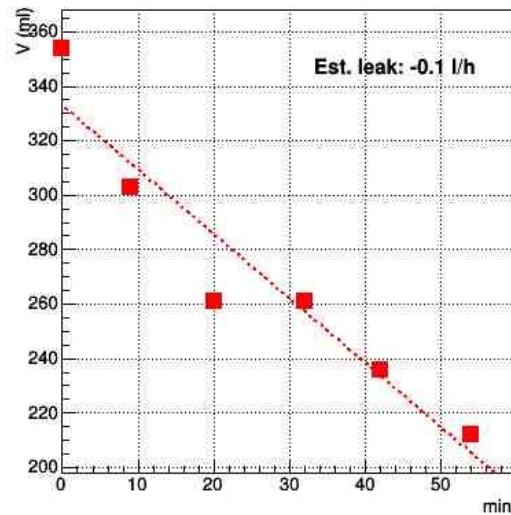
20170407009 gas tightness



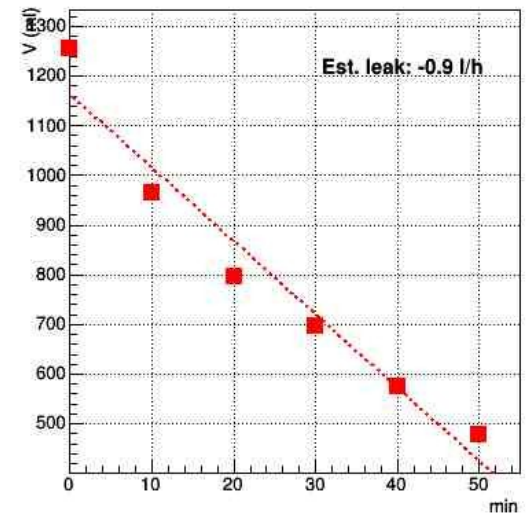
20170425010 gas tightness



20170426011 gas tightness

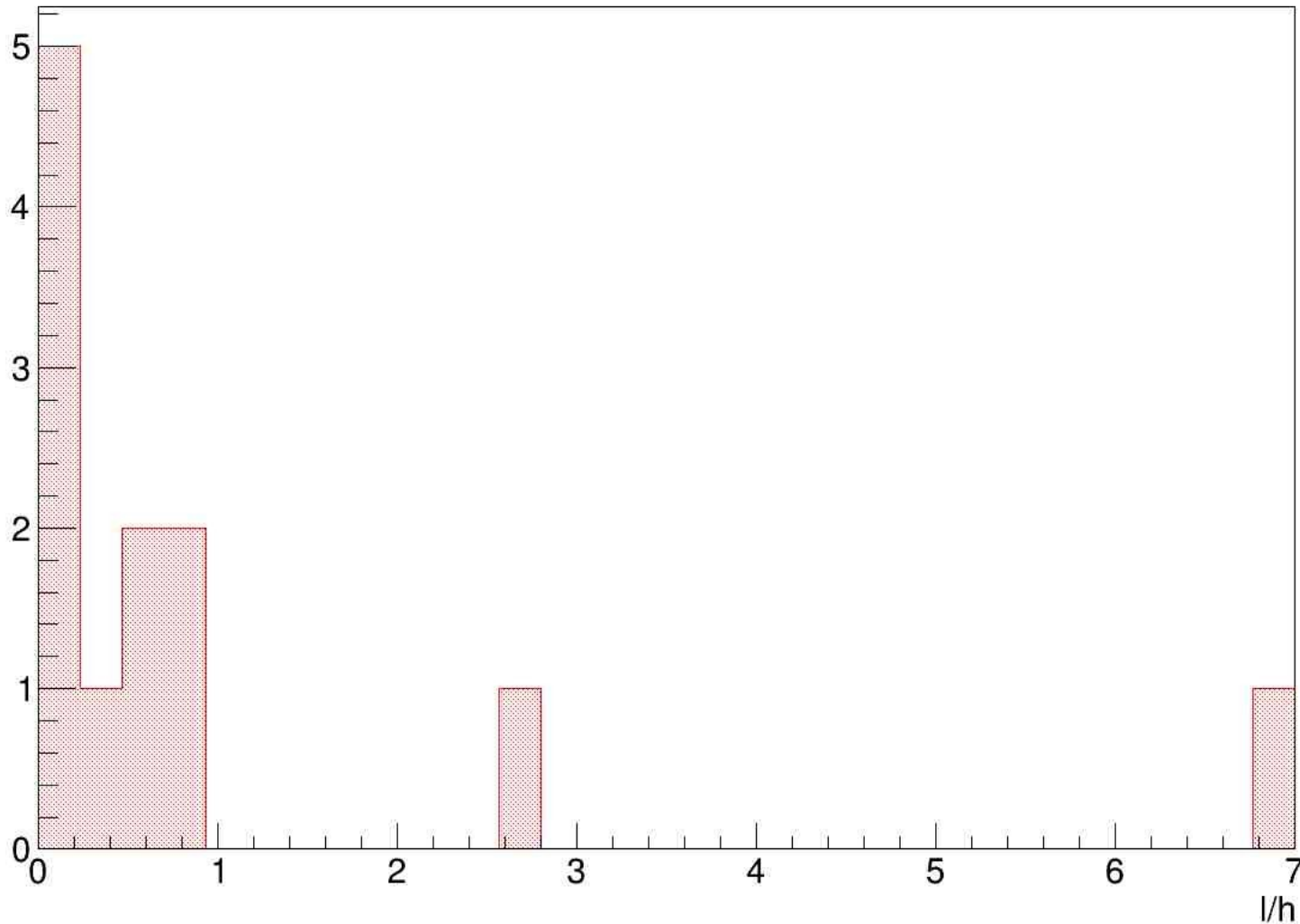


20170427012 gas tightness



Gas tightness tests

Chambers leak distribution



Gas tightness tests

A sniffer has been used to detect leakages:

On chamber 001, after 4 days fluxing, **no leak can be identified** by the sniffer.

On chamber 2 (7 l/h estimated) after 12 hours fluxing **no leakages can be identified**

Hypotesis:

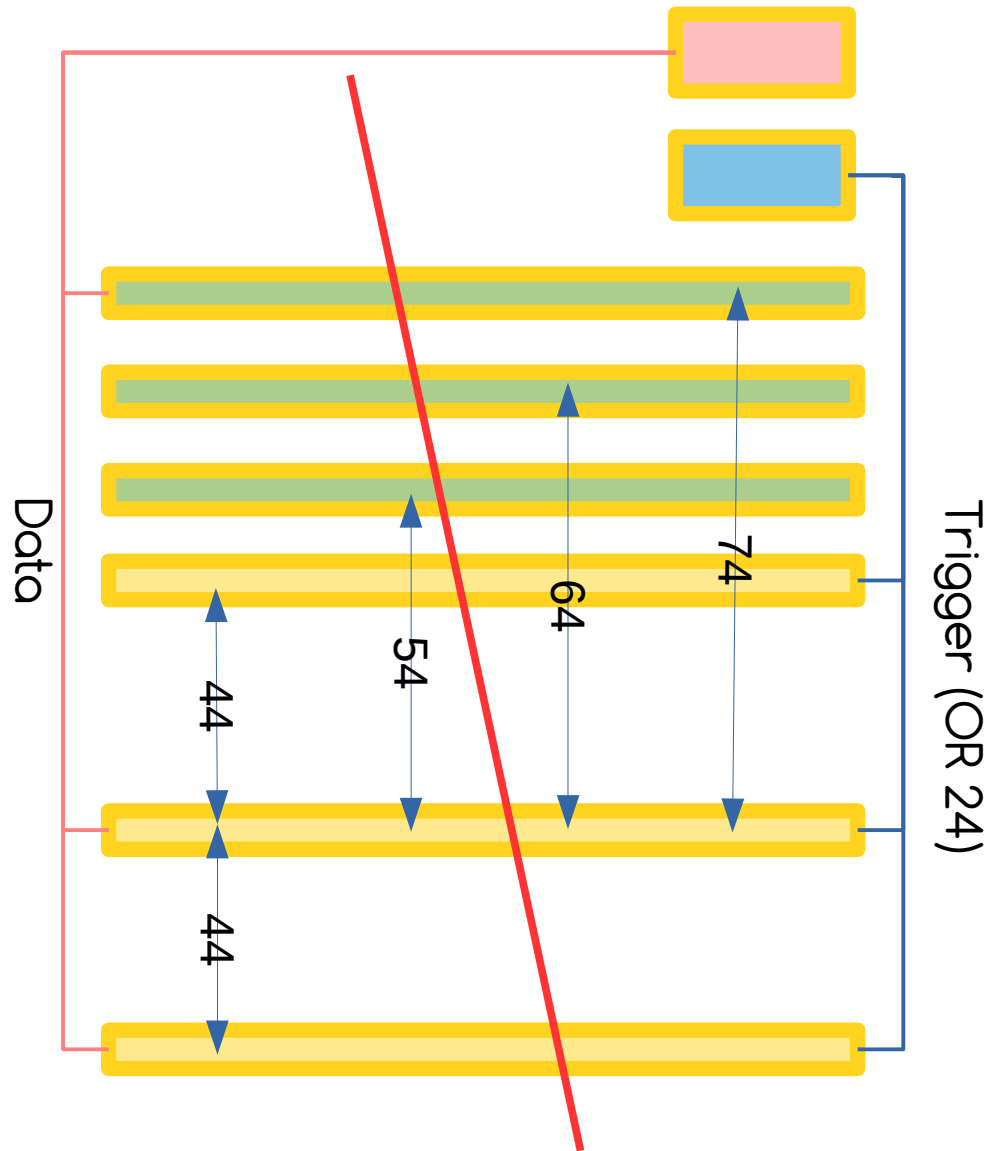
1. the leak are **distributed**
2. we have to **estimate better the corrections** to the estimation

However seems that

0.1-0.3 l/h is the standard for good chamber

What about the others?

Efficiencies



Efficiency is measured for the 3 chambers laying on CERN-01 (green).

Chambers are fluxed 4 days before measurements.

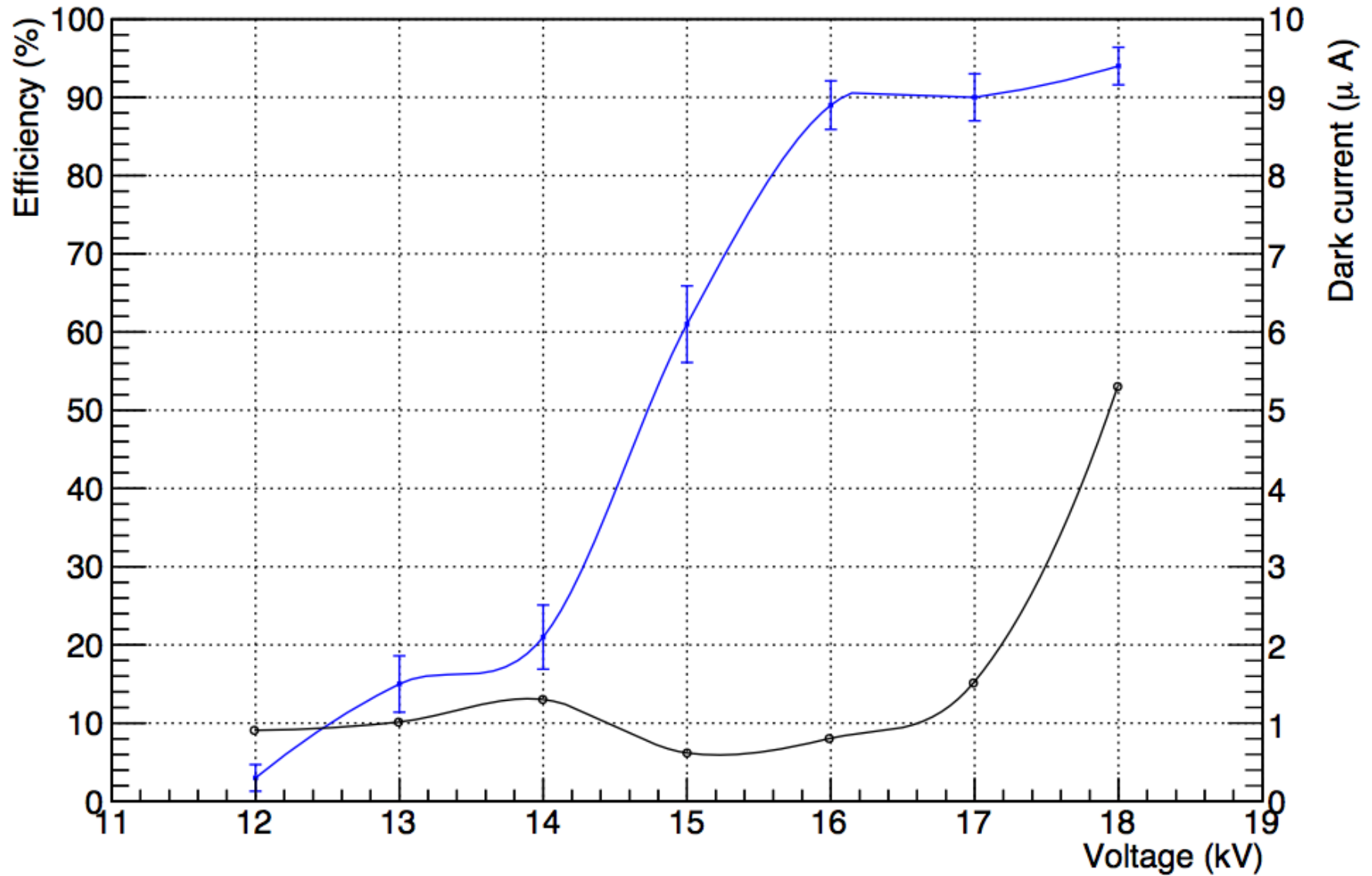
The trigger is the CERN-01.

The data sent to DAQ come from CERN-01 bottom and middle chamber and one of the chambers under test.

By reconstructing tracks triggered by CERN-01, hits on tested chamber are searched.

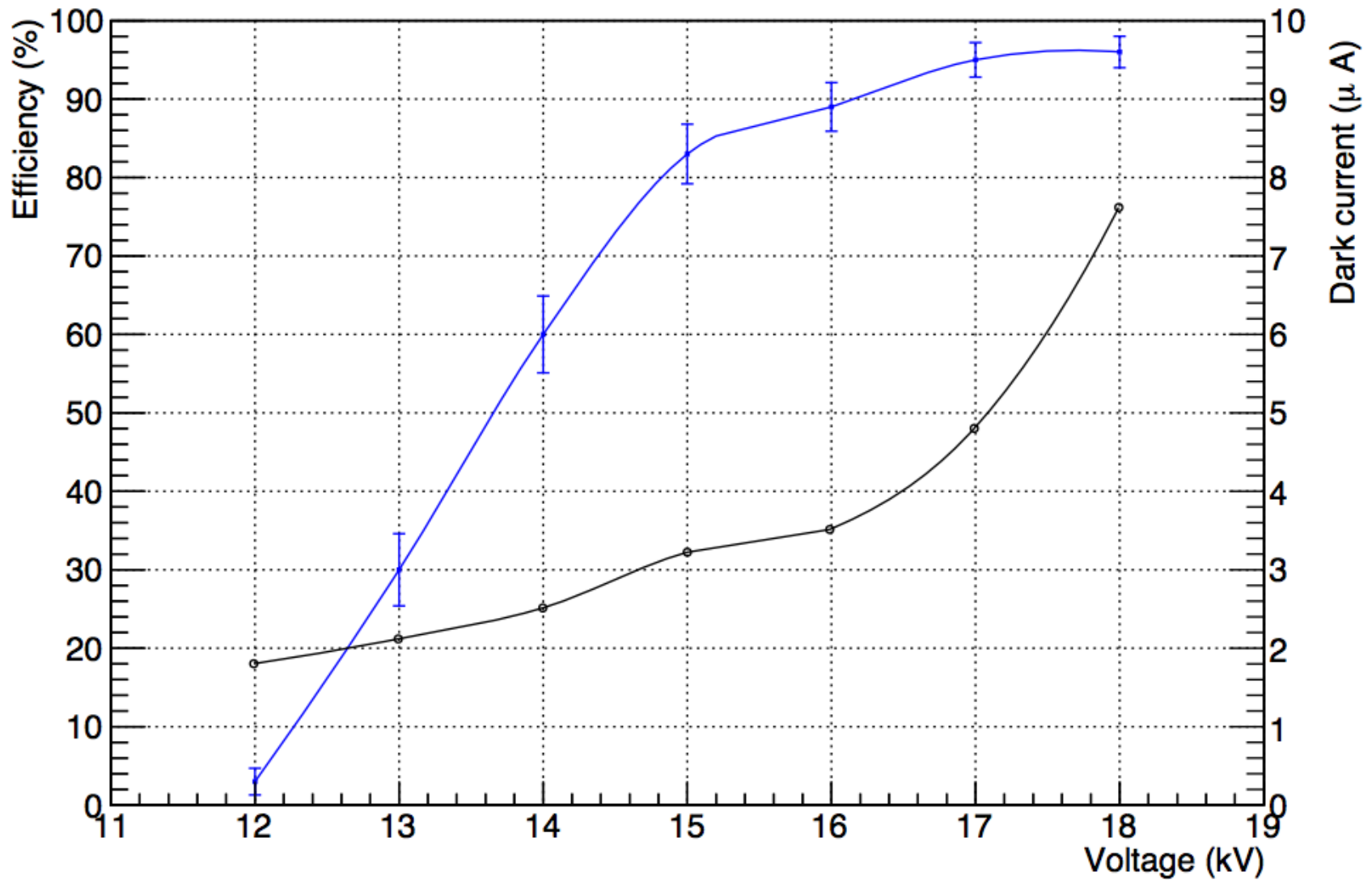
Efficiencies

20170222001 by scintillators



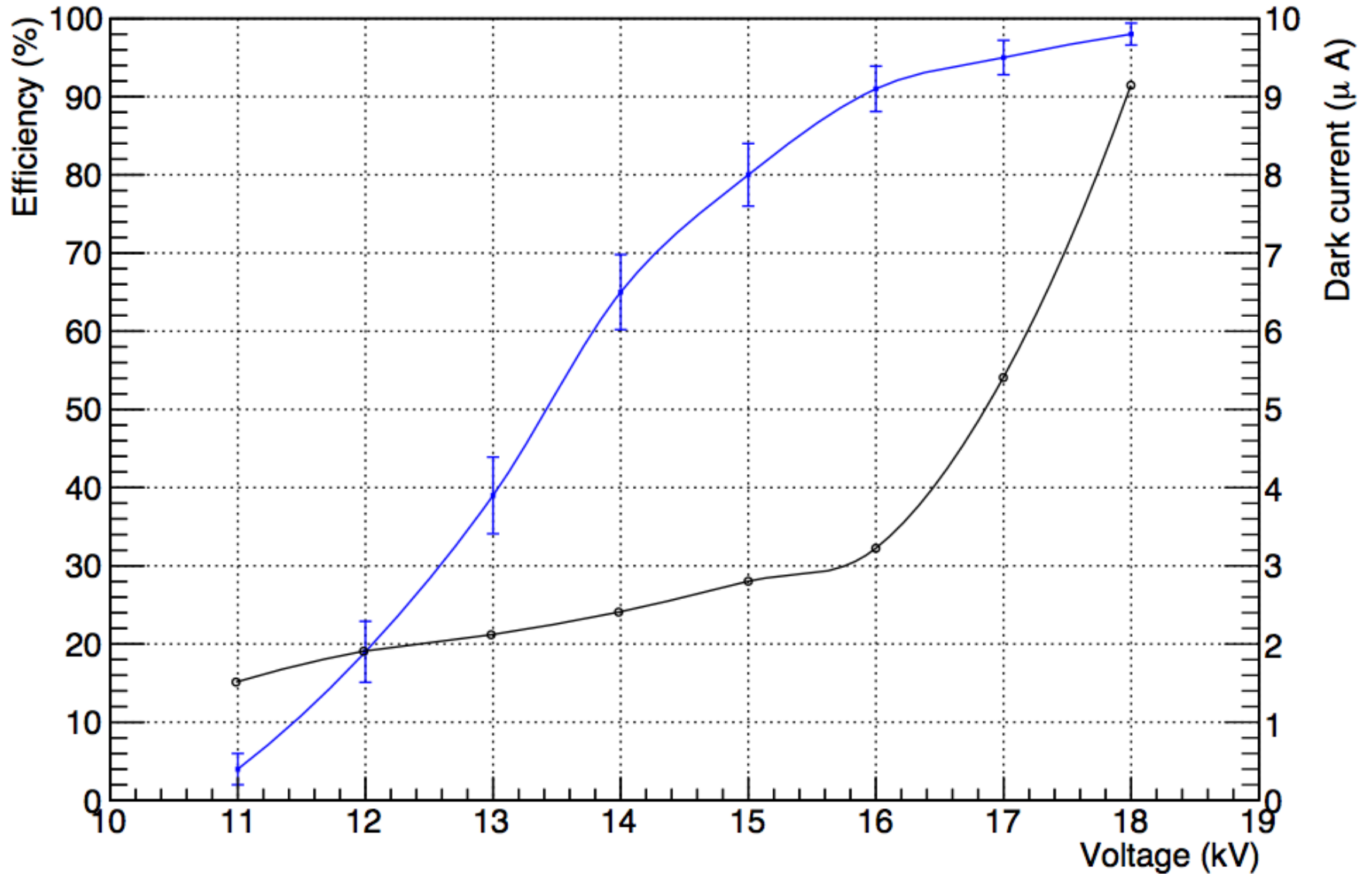
Efficiencies

20170223002 by scintillators



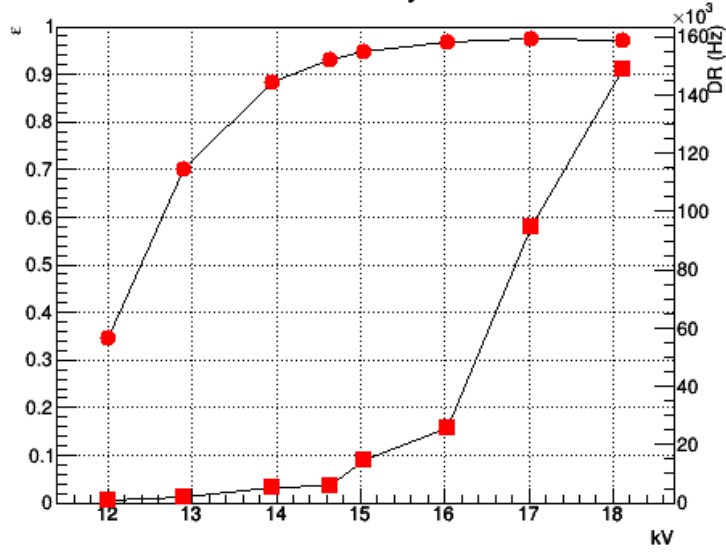
Efficiencies

20170252003 by scintillators

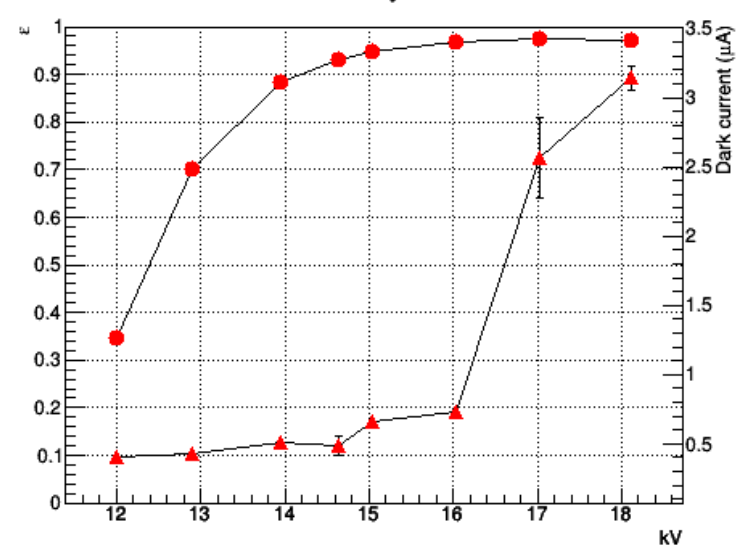


Efficiencies

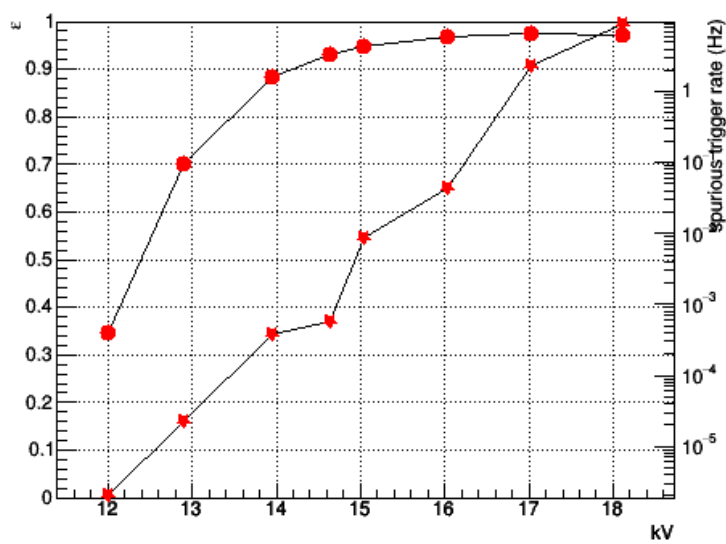
20170405007 Efficiency and Dark Rate



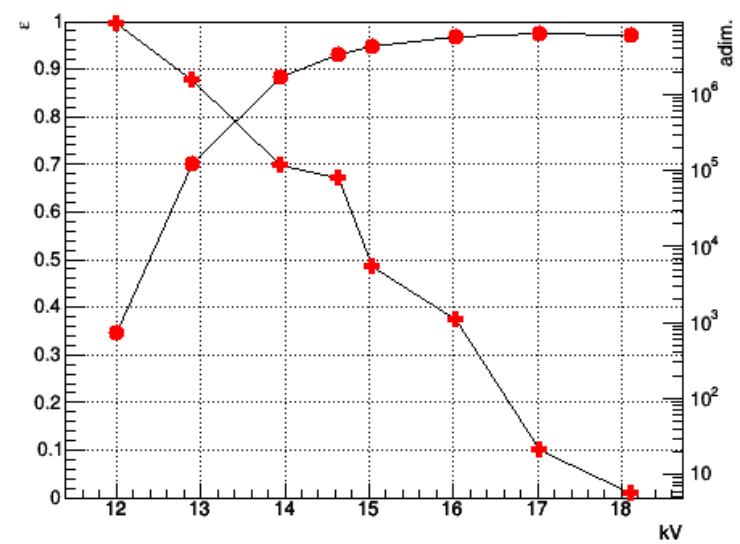
20170405007 Efficiency and Dark Currents



20170405007 Efficiency and Spurious triggers

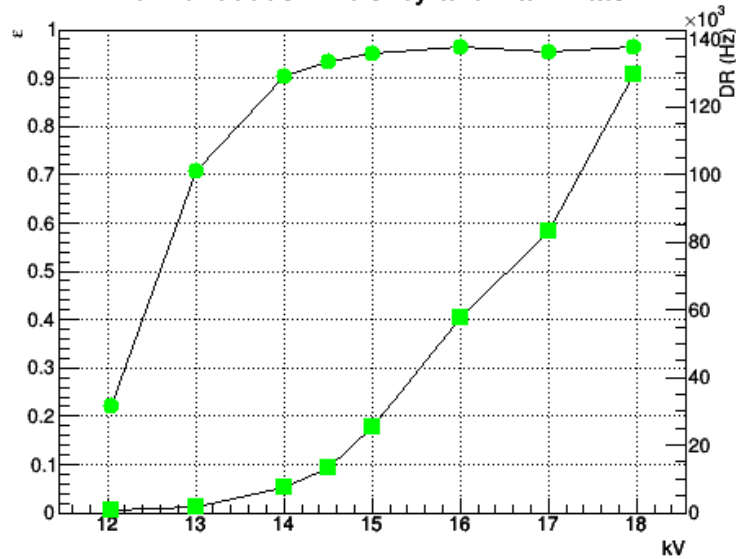


20170405007 Efficiency exp. rate / spurious

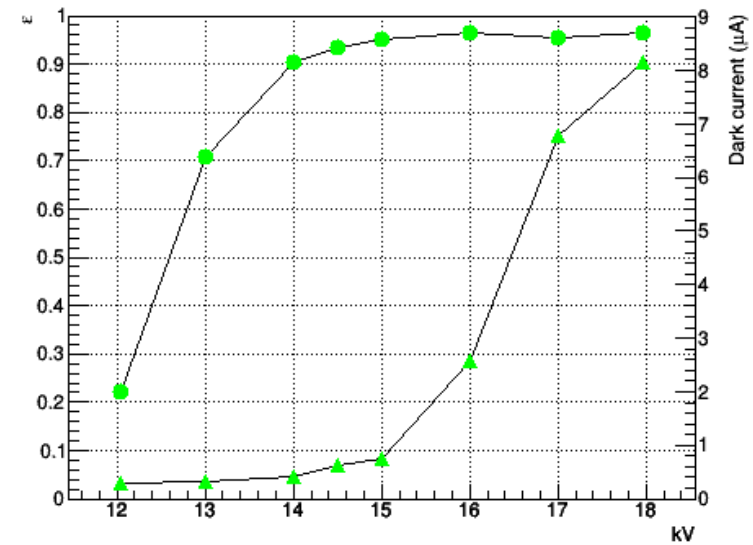


Efficiencies

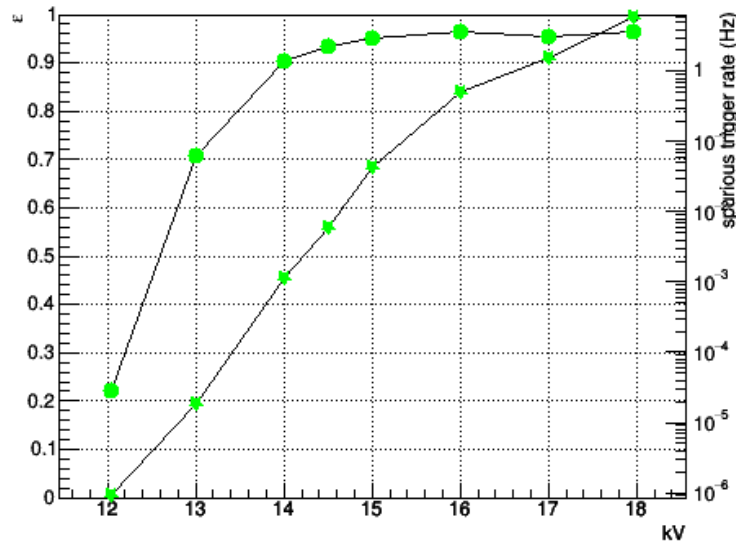
20170406008 Efficiency and Dark Rate



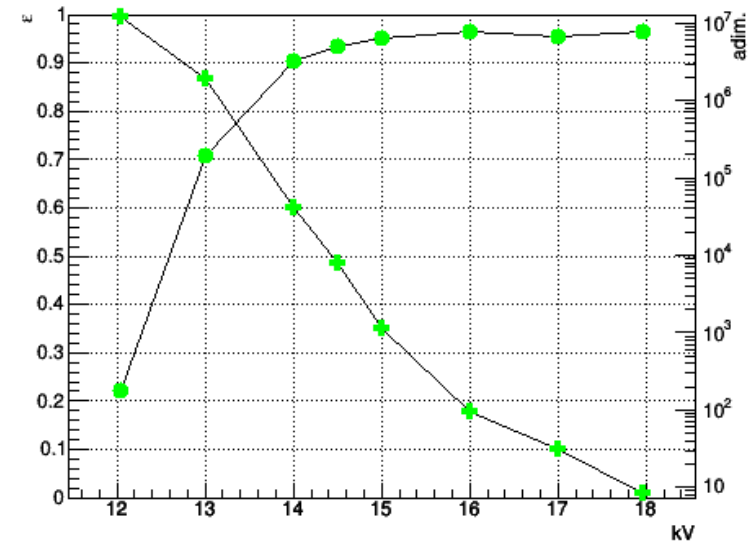
20170406008 Efficiency and Dark Currents



20170406008 Efficiency and Spurious triggers

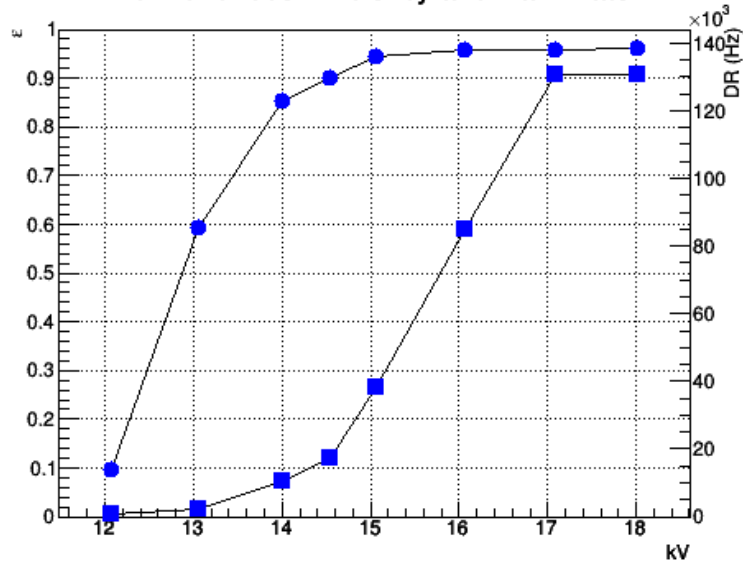


20170406008 Efficiency exp. rate / spurious

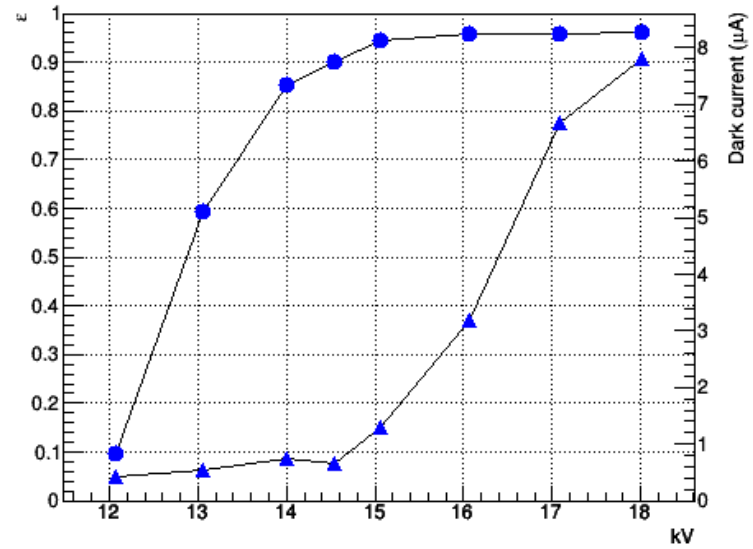


Efficiencies

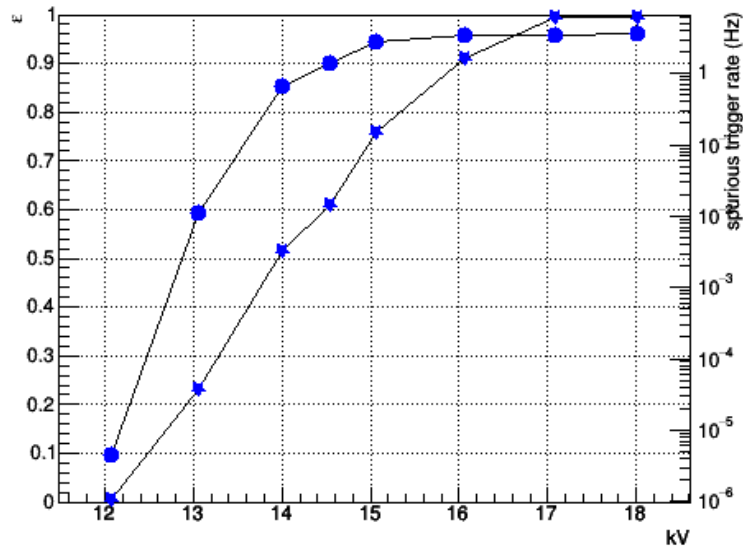
20170407009 Efficiency and Dark Rate



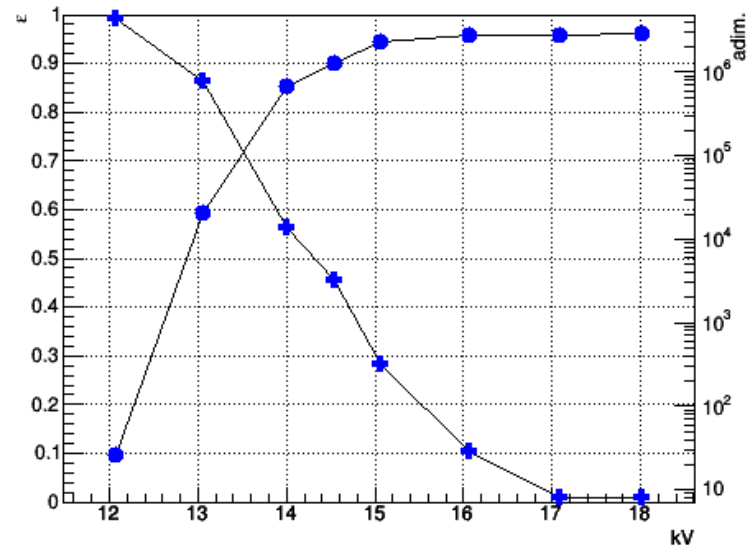
20170407009 Efficiency and Dark Currents



20170407009 Efficiency and Spurious triggers

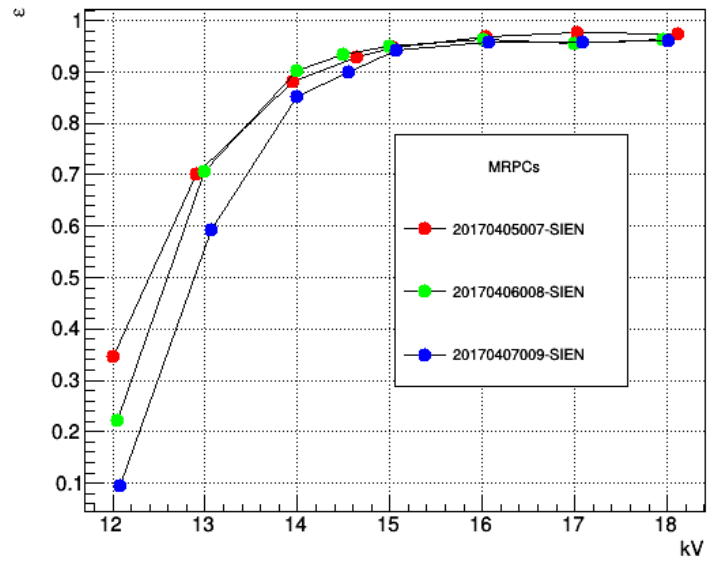


20170407009 Efficiency exp. rate / spurious

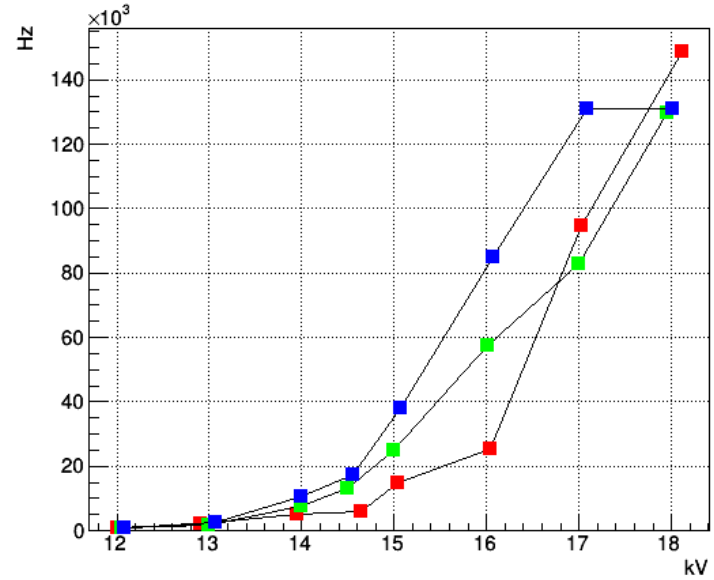


Efficiencies

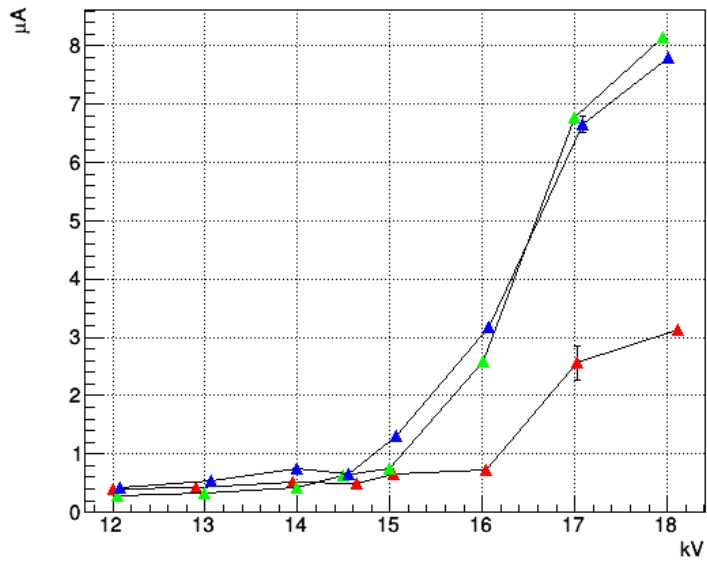
Efficiency



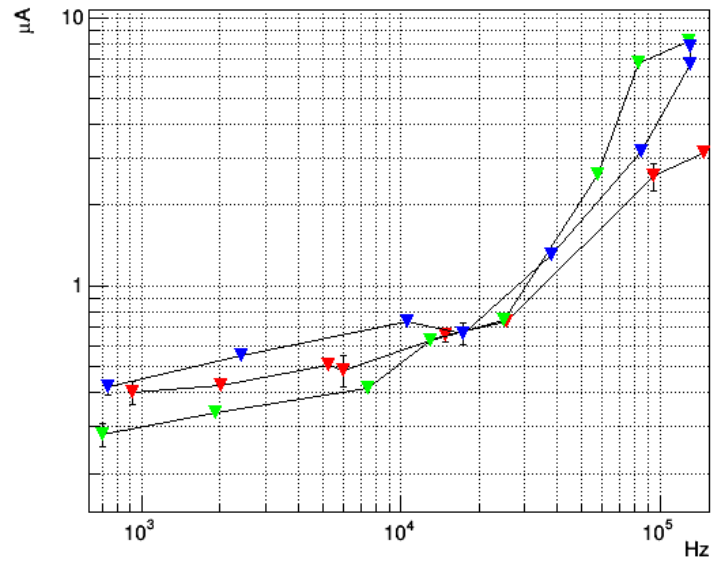
Dark Rate



Dark Current



Dark Current vs Rate



Efficiencies

Efficiencies are **very good**.

Especially for 007-008-009 **stable plateau** is shown.

Dark Rates and Currents
are not strongly significant
because the telescopes
are fluxed only few days
and high voltages
are applied few days/hours
before the measurements.

We should decide if we want
a real Dark Rate/Dark Current
behaviour and change test flow

Comments/Ideas/Upgrades