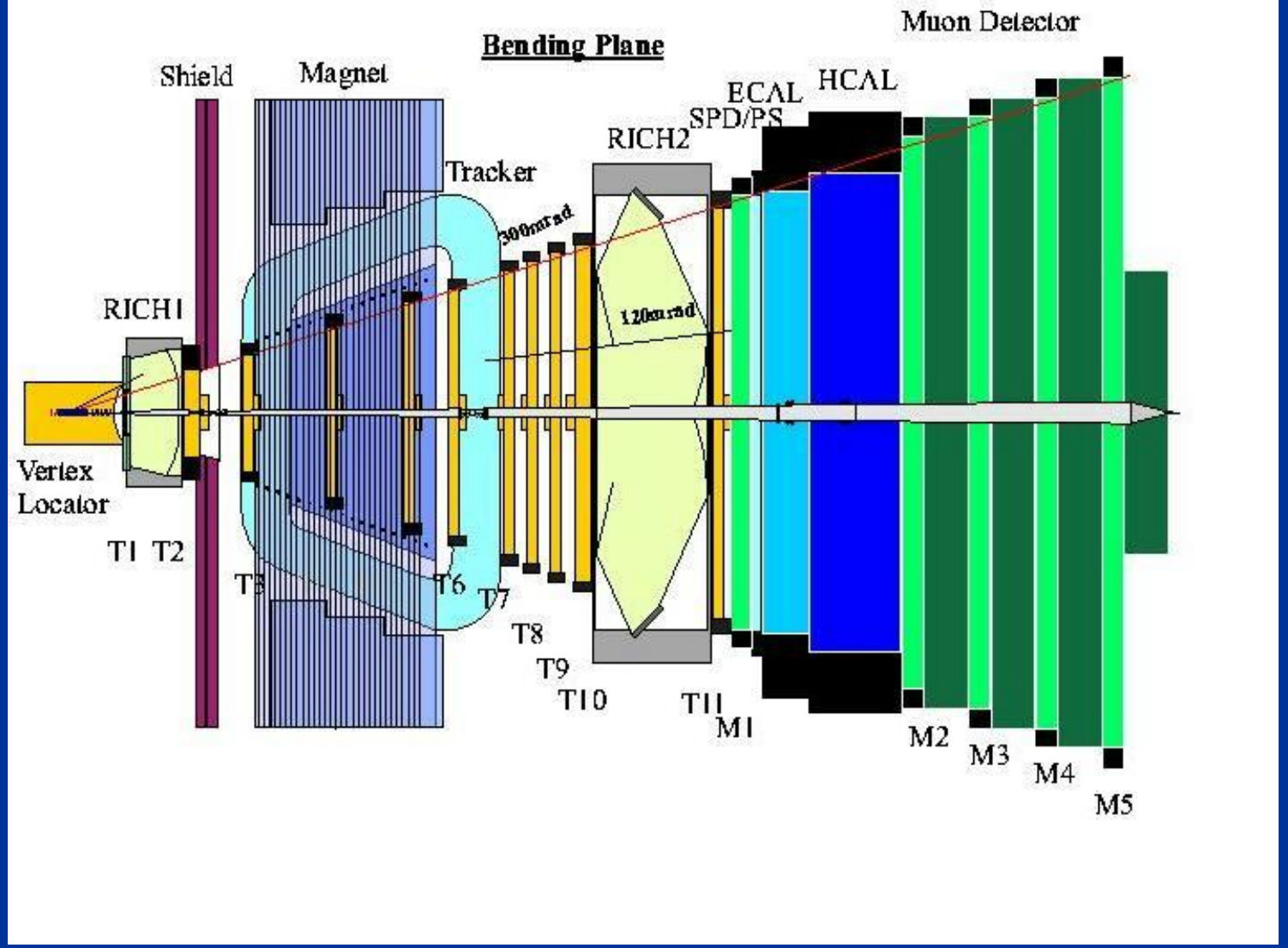
LHCb

LHCb


Bending Plane
Muon Detector
Shield
Magnet
ECAL
HCAL
SPD/PS
RICH2
Tracker
300mrad
120mrad
RICH1
Vertex
Locator
T1 T2
T3
T6
T7
T8
T9
T10
T11
M1
M2
M3
M4
M5

LHCb Muon System

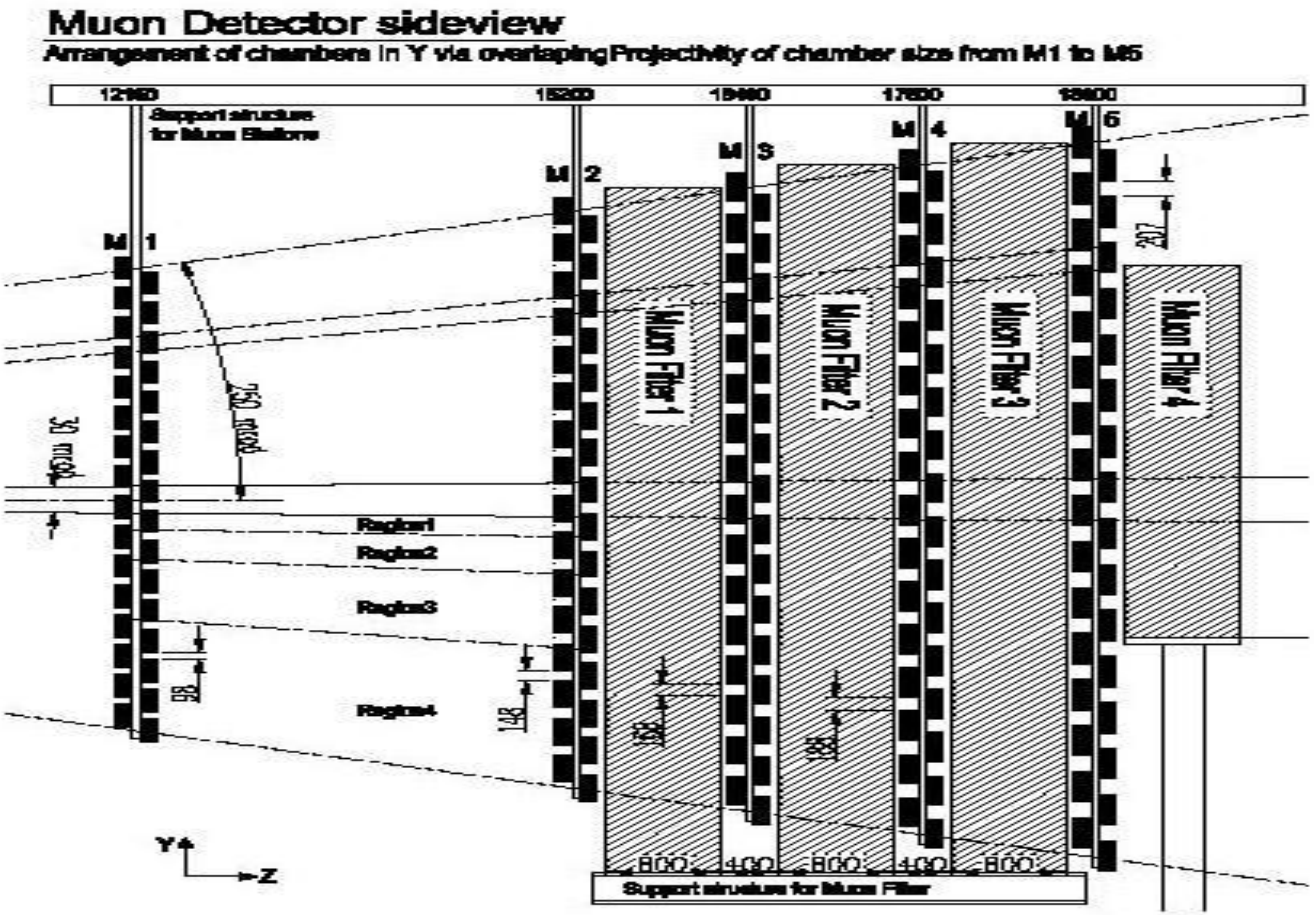
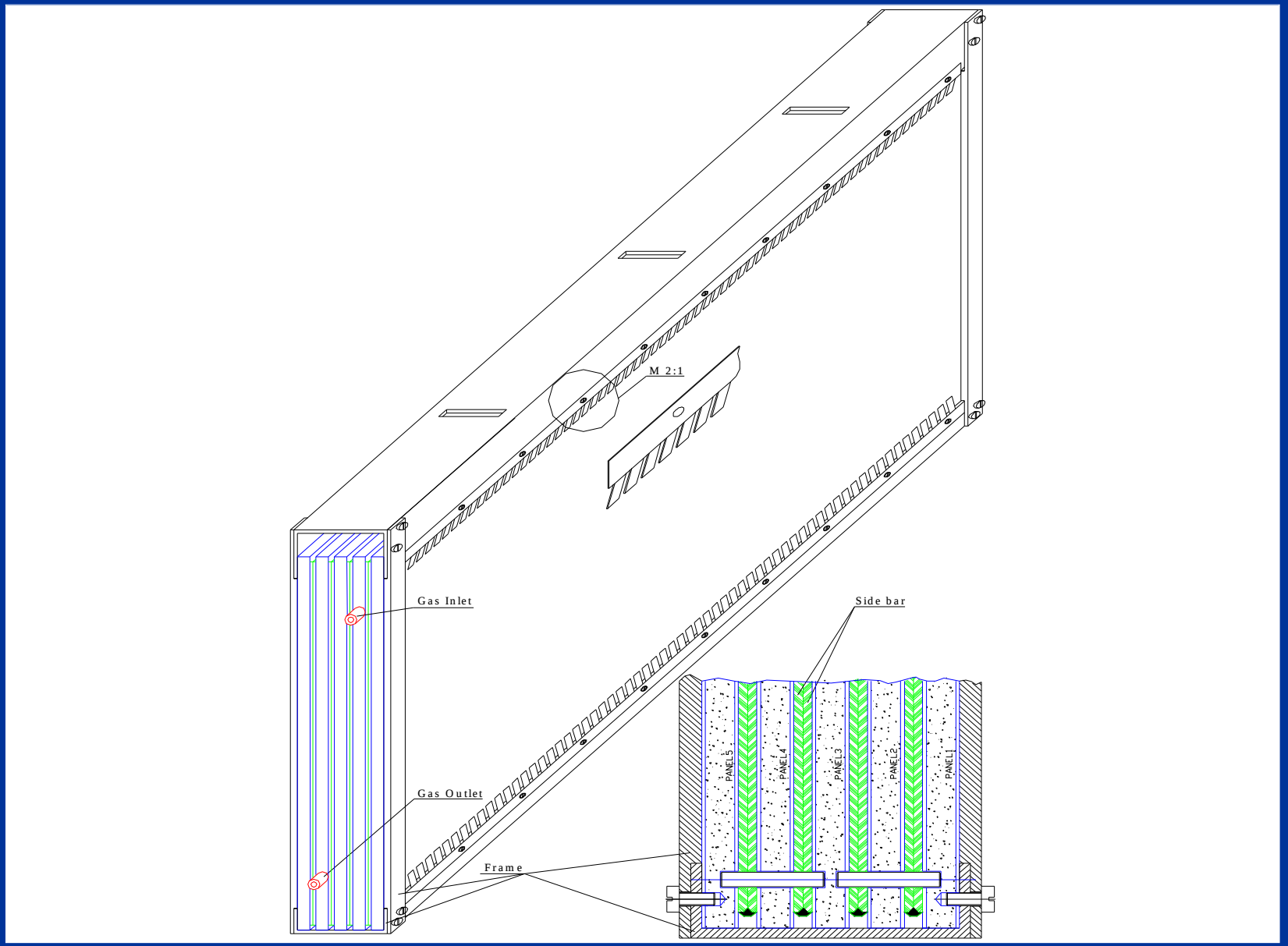
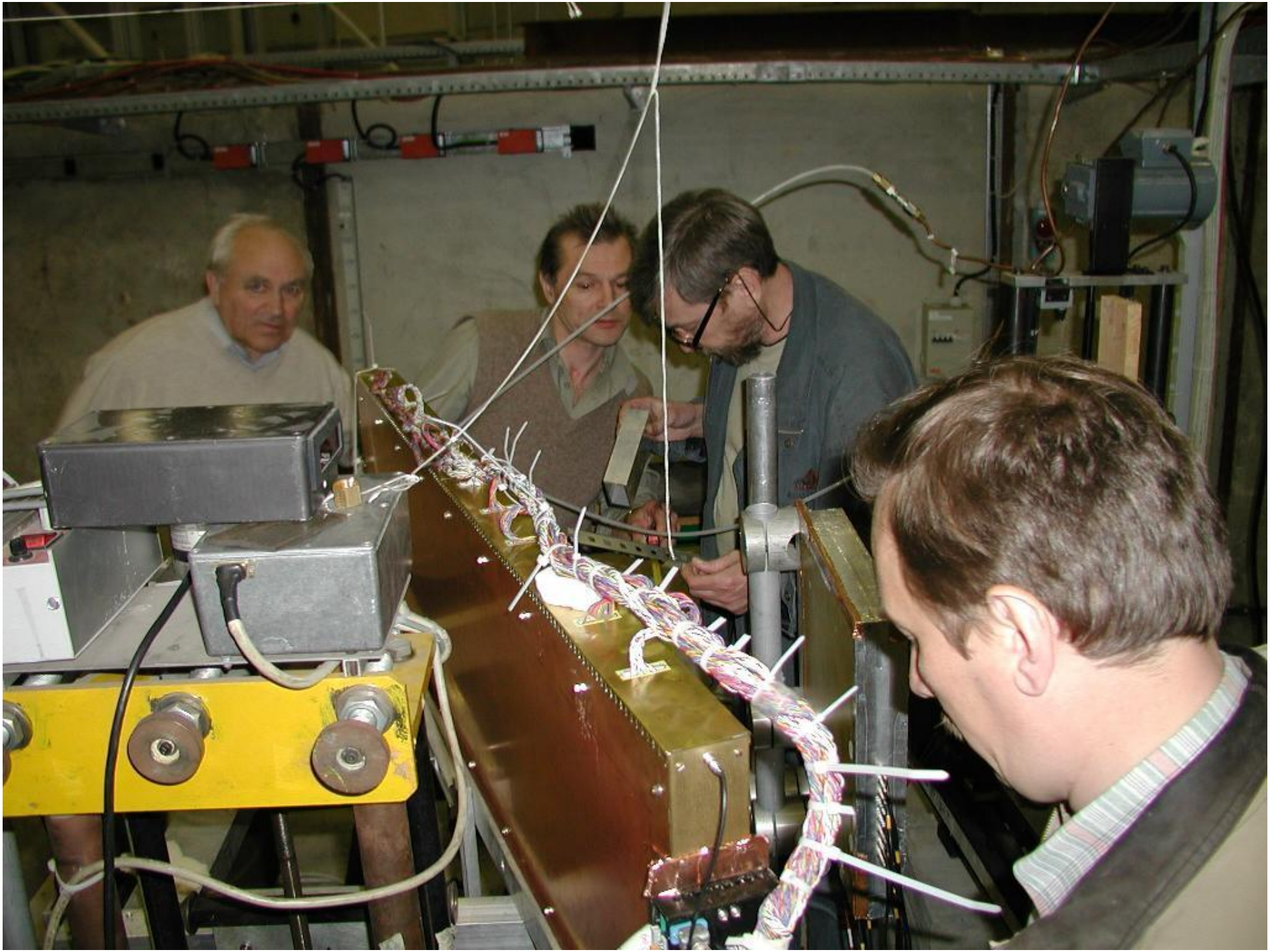


Figure 7 Side view of the muon system in the y,z plane


M 2:1
Gas Inlet
Gas Outlet
Frame
Side bar
PANEL 5
PANEL 4
PANEL 3
PANEL 2
PANEL 1



Overall plans

Total number of chambers in Muon System
1300 chambers

In total, 600 chambers should be produced at PNPI

200 M3R4

200 M2R4

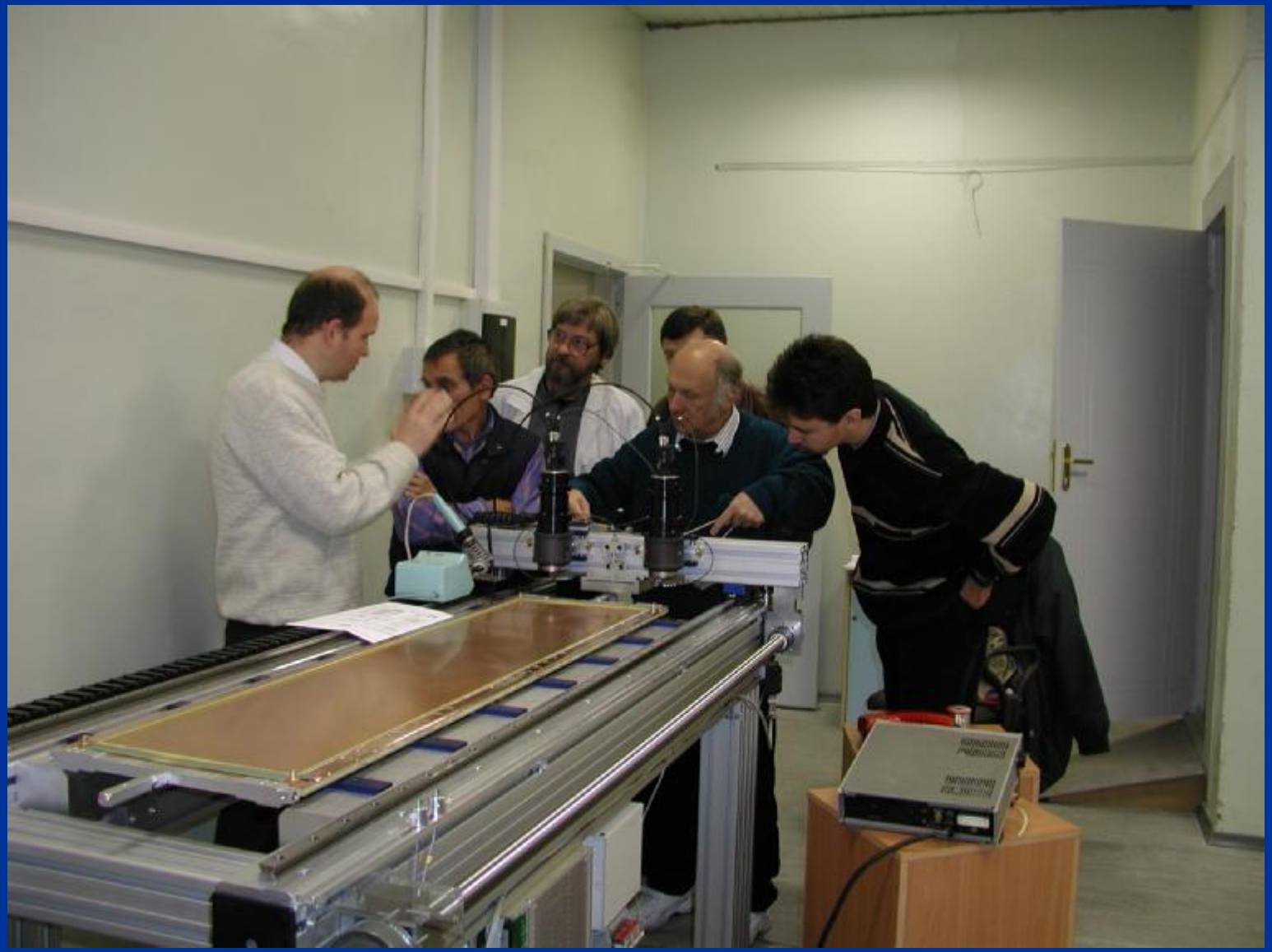
200 M4R4

PNPI-1 factory (operating since Jan 2004)

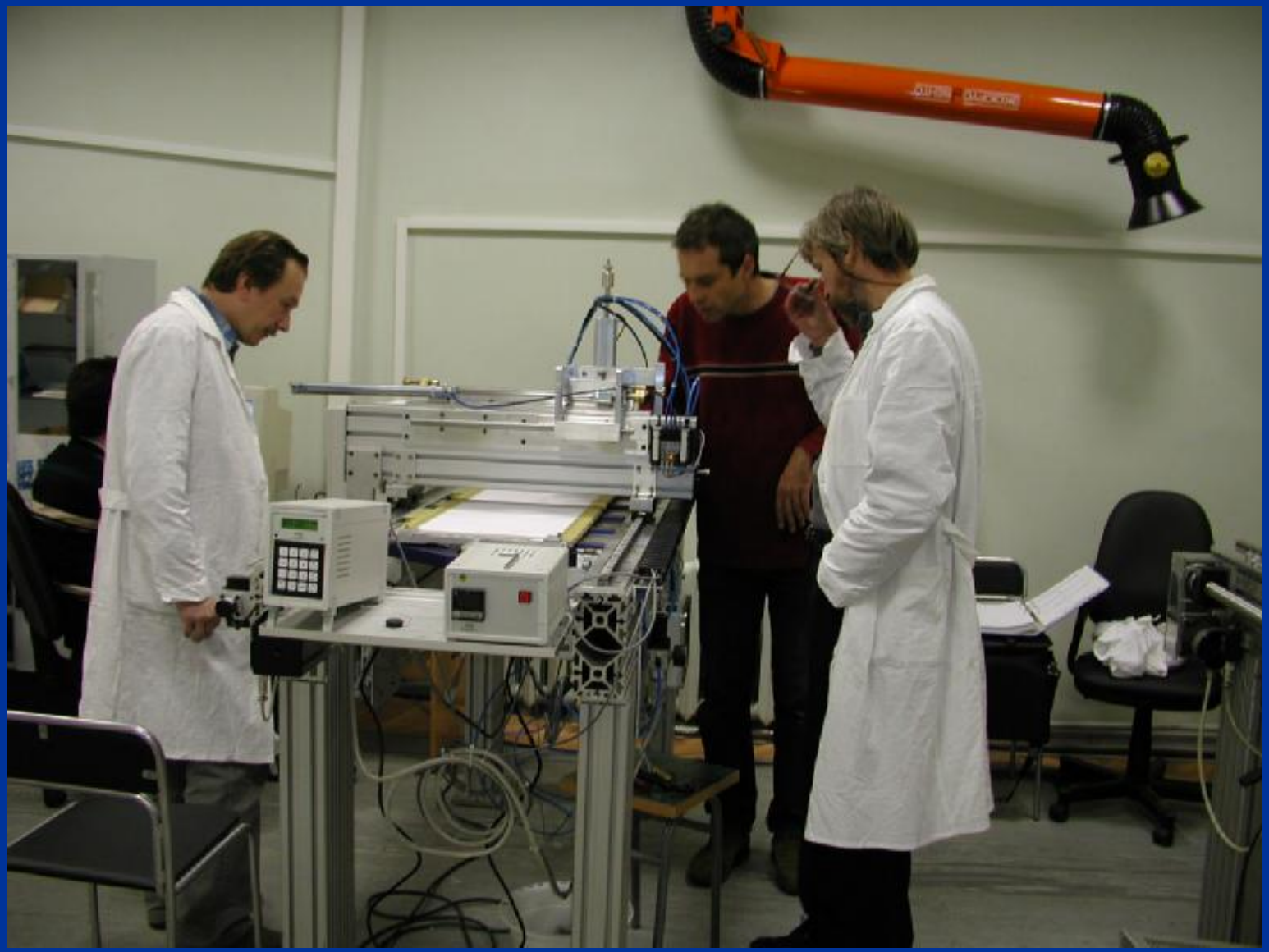
PNPI-2 factory (should start in Dec 2004)

PNPI-1 Muon Chamber Factory

Wire pitch & tension measuring machine



Wire soldering machine



Main milestones (as planned in April 2003)

100 M3R4 (PNPI-1)	Jan 1,2005
Start of PNPI-2	Dec. 2004
200 M3R4 (PNPI-1)	July 1,2005
200 M2R4 (PNPI-1 +PNPI-2)	May 1,2006
200 M4R4 (PNPI-2)	July 1, 2006

Production status

No production in October (material supply problem).

5 weeks delay

The production rate in November/December was nominal:

4 chambers per week.

17 chambers produced in November.

17 chambers produced in December

By the end of December

82 M3R4 chambers will be assembled and tested.

Assembly procedure goes without big problems

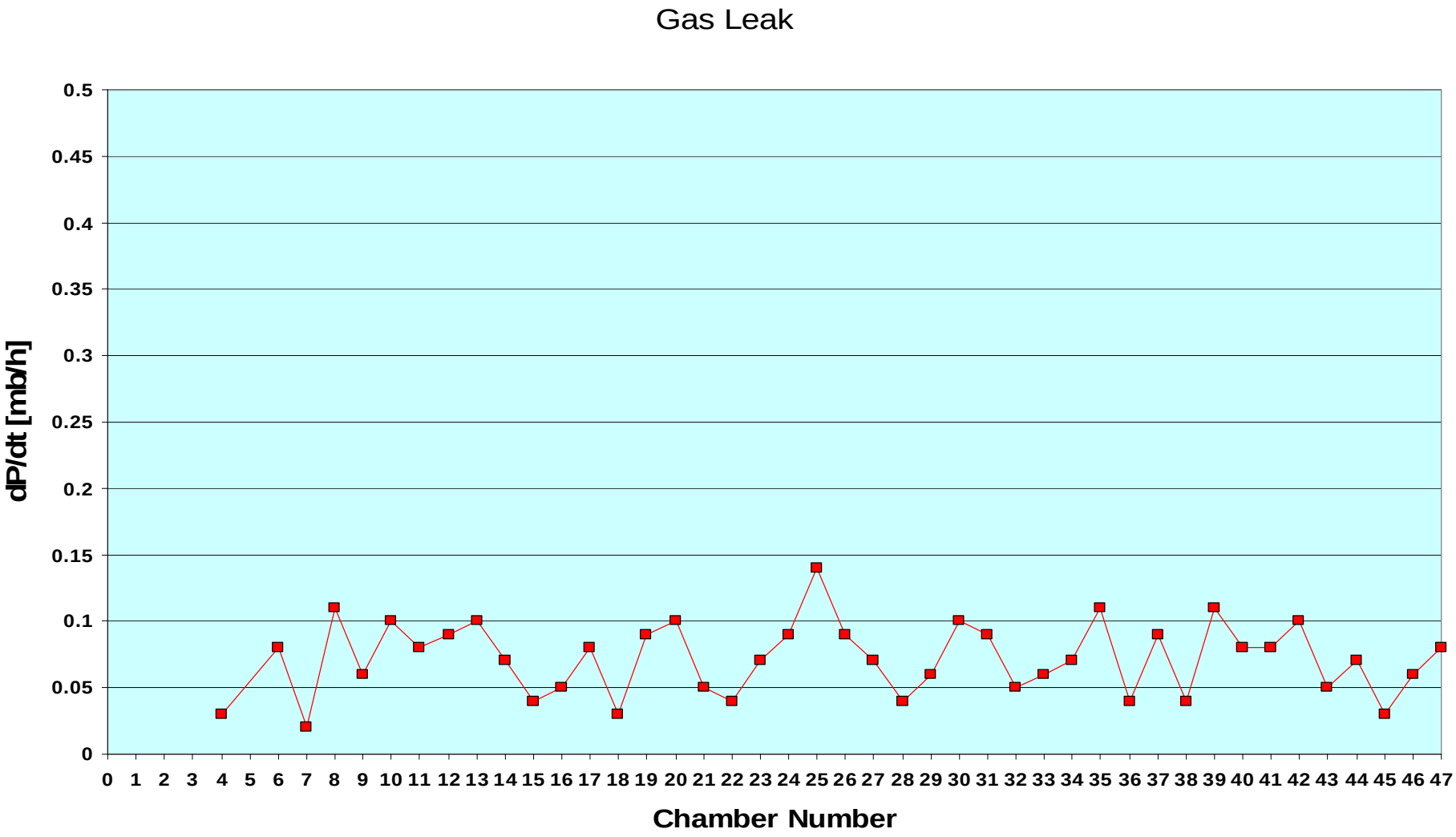
Gap size
Wire pitch
Wire tension
are well within specifications

Problems with some panels:
Bad planarity
Wrong position of some holes

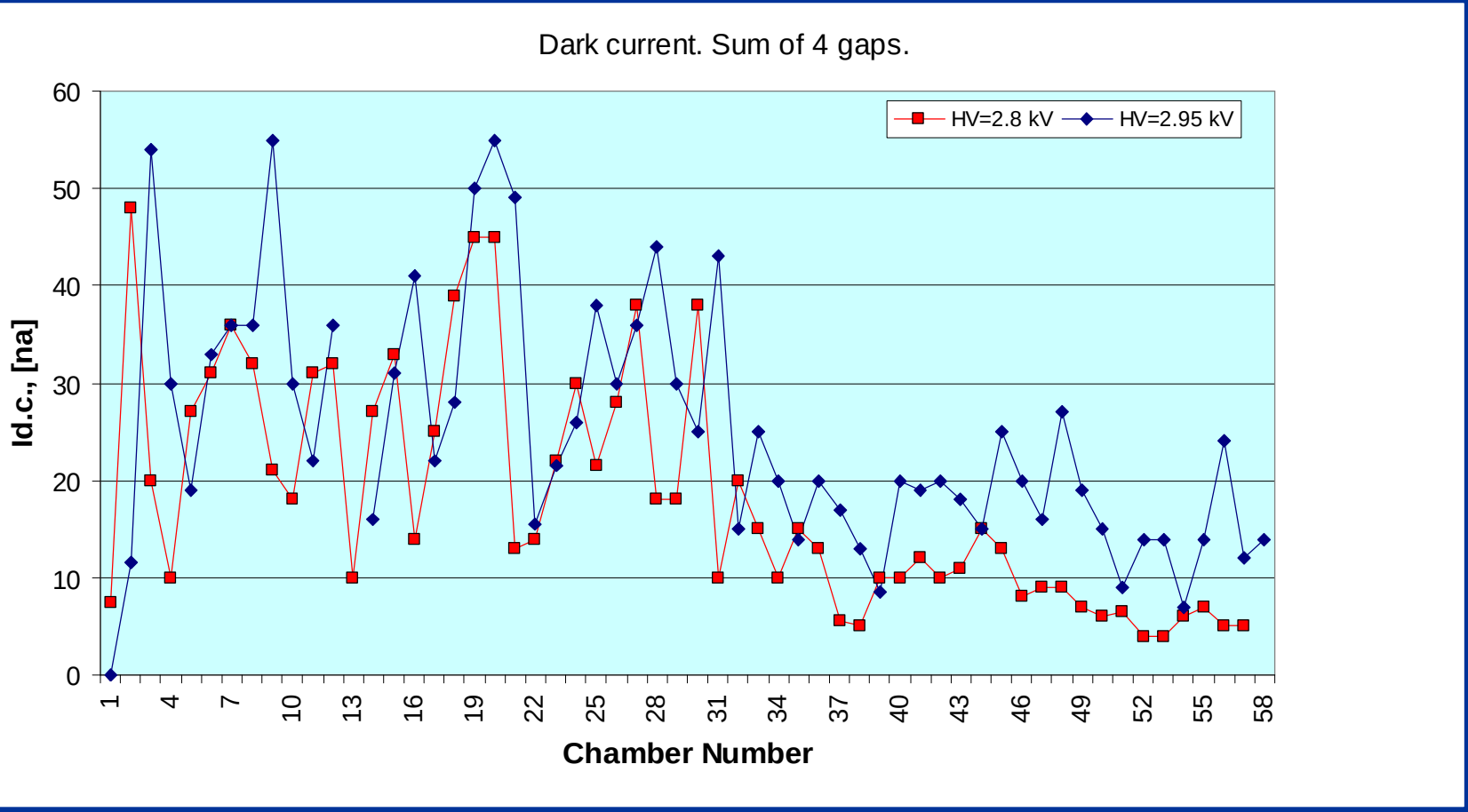
Introduced inspection and rejection of such panels

chamber test results

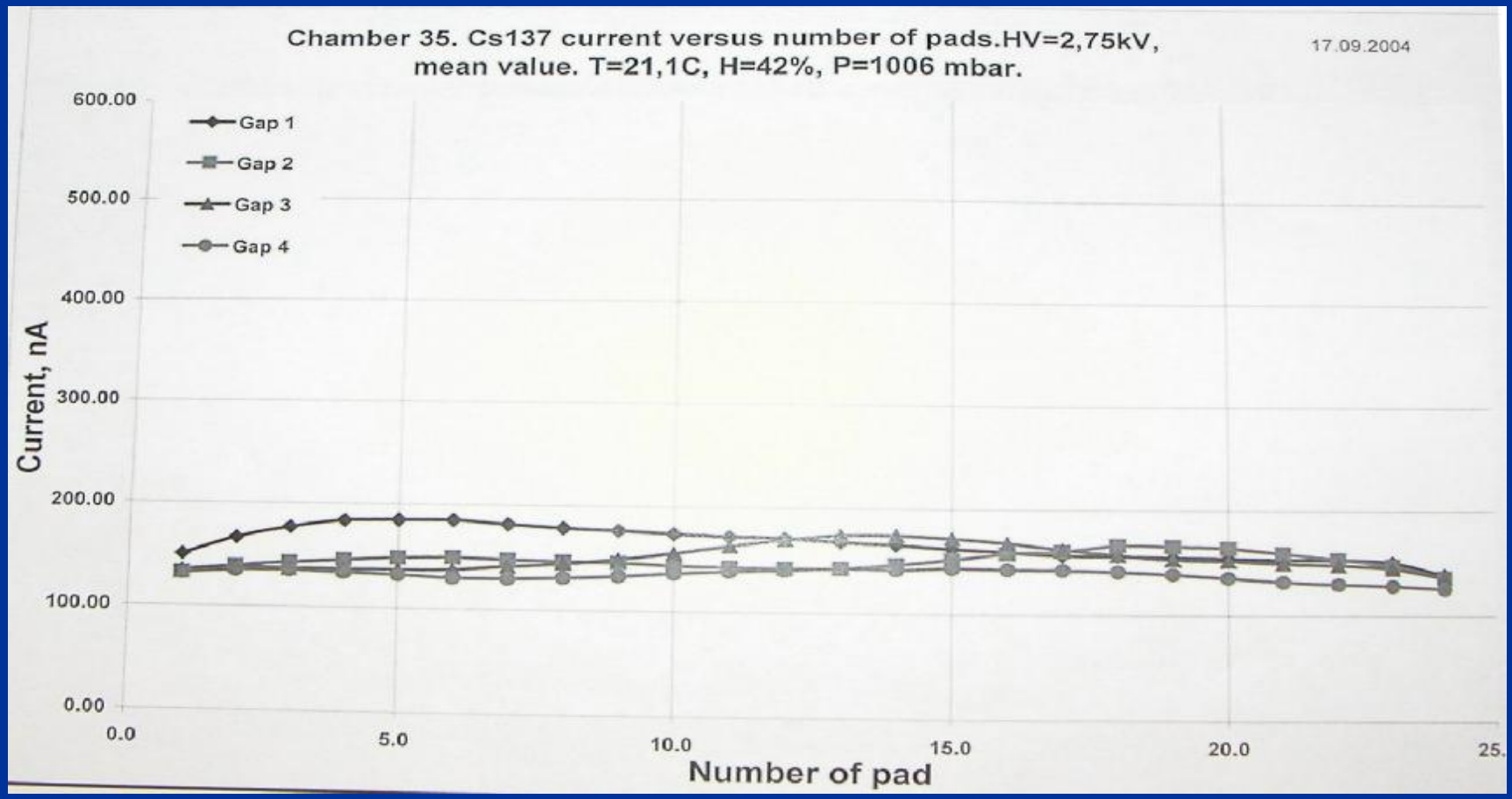
Gas Leak


Gas Leak
dP/dt [mb/h]
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
Chamber Number

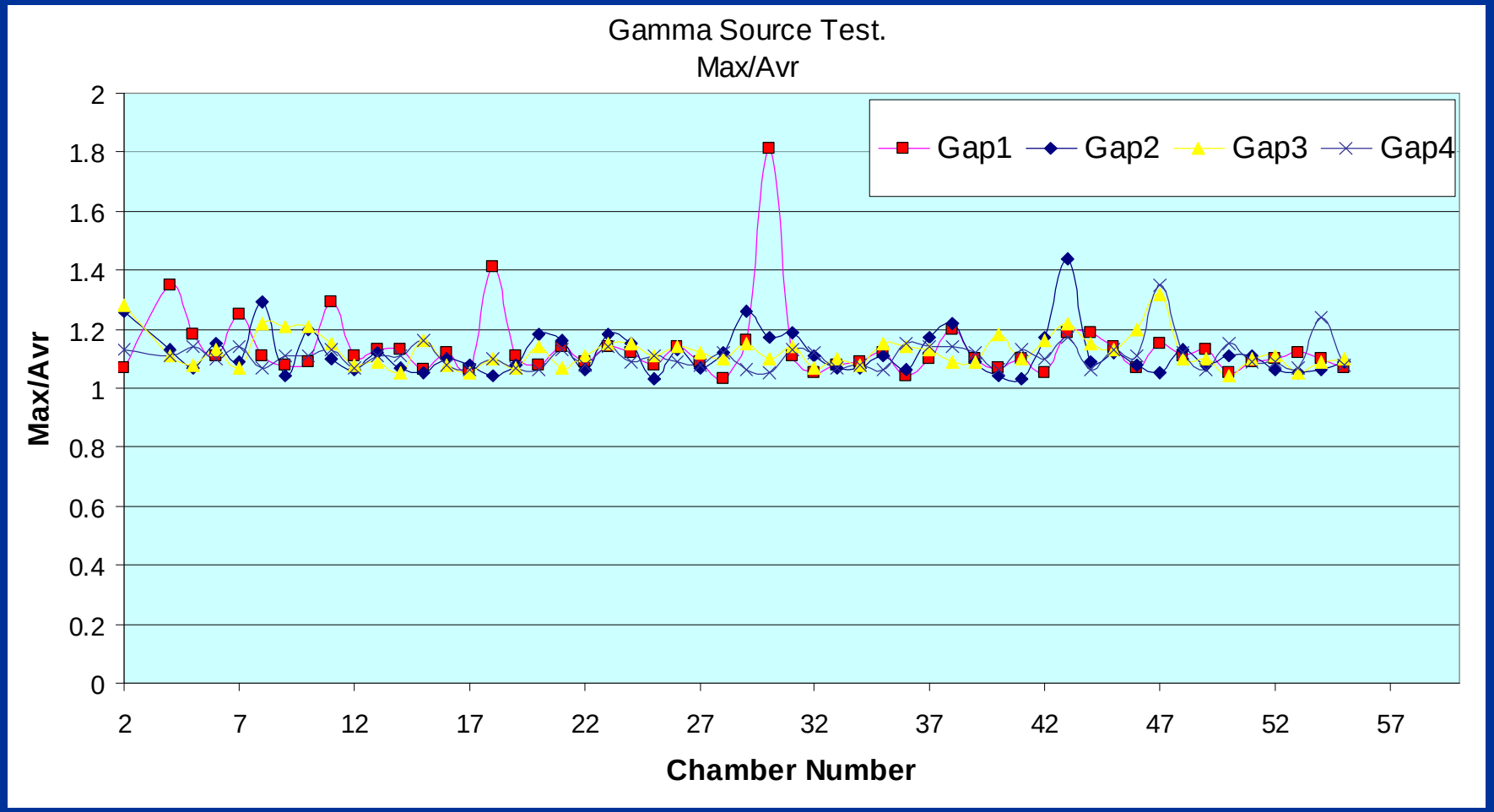
Dark current. Sum of 4 gaps.



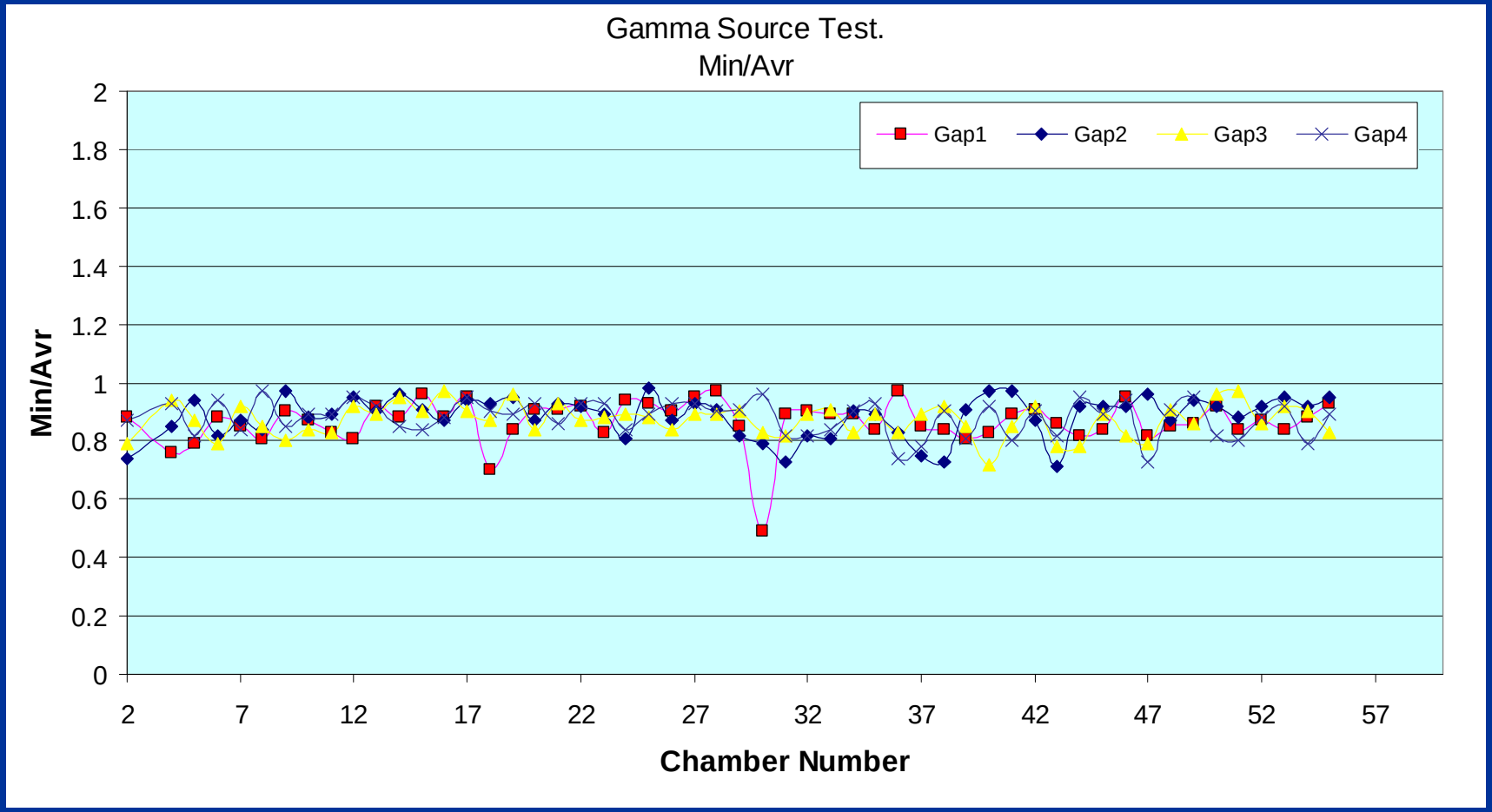
Gamma scan.


Chamber 35. Cs137 current versus number of pads.HV=2,75kV,
mean value. T=21,1C, H=42%, P=1006 mbar.
17.09.2004
Gap 1
Gap 2
Gap 3
Gap 4
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Current, nA
0.0
5.0
10.0
15.0
20.0
25.
Number of pad

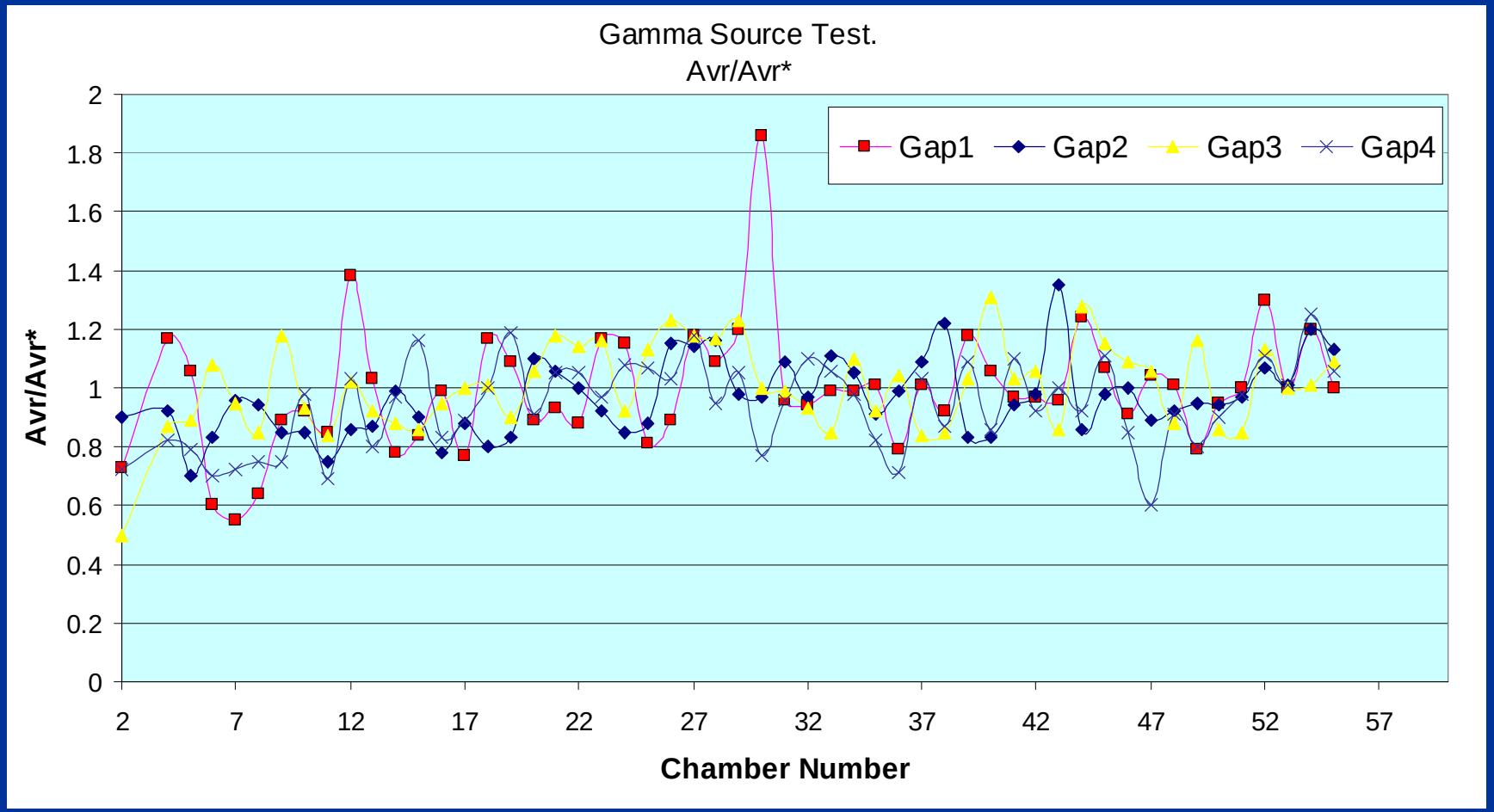
Max Gain/Average Gain for single gaps



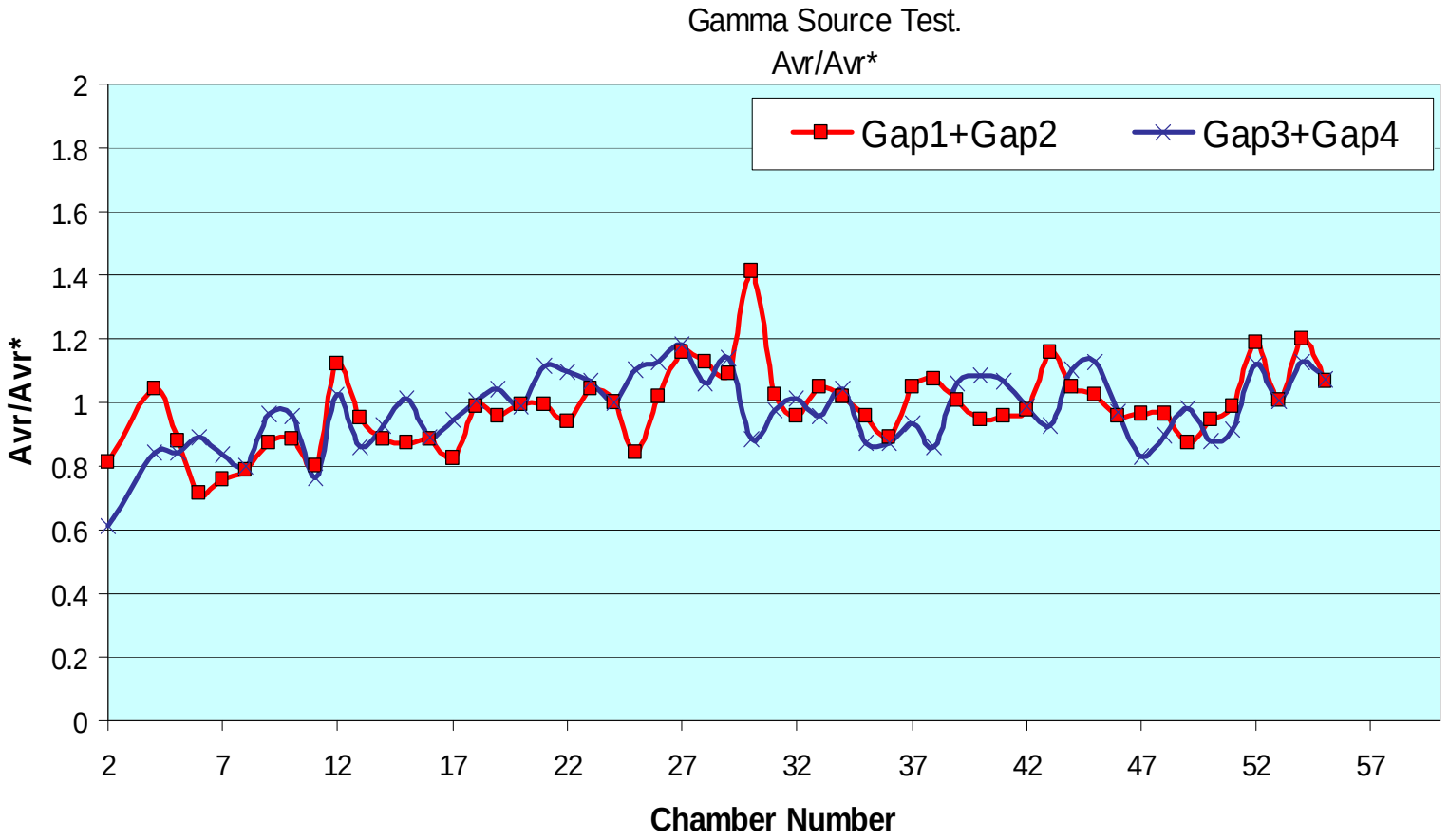
Min Gain/Average gain for single gaps



Comparison of Gas Gains from various single gaps



Comparison of Gas Gains in various double gaps



Summary from tests

- All assembled chambers operate up to **2.95 kV**

.

- Gas leak is **10 times less** than specified

- Gas gain is uniform within each gap within **+/- 30%**

- Variation of GG for various single gaps in various chambers is within **+/- 30%**

- Variation of GG for various double gaps in various chambers is within **+/- 20%**

PNPI – 2
4 chambers per week
from February