

LINAC2-LINAC3 Post-mortem

F.Roncarolo – BI-TB 02 Oct 2014

LINAC2-LINAC3 BCTs

- During HW commissioning
 - All BCT checked – HW ok
- At start-up
 - Problem in copying PPM settings from one user to another
 - After some discussions: BE-CO fixed the problem

N.B: PPM not needed for LINACs, but FESA classes shared with other machines

LINAC + TLs BPMs

- HW commissioning ok
- At start-up:
 - Problems in understanding trajectory measurements
 - Problem traced back to misunderstanding in BPM alignment w.r.t. reference zero trajectory
 - Ideal trajectory or interpolation of measured adjacent equipment (e.g. quads) ?
 - My understanding (from L.Soby + R.Scrivens)
 - Different requests from different 'users' ended up in some uncertain alignment
 - All being checked/fixed (introduce proper 0 reference in acquisition system) by BE-OP kick response studies
 - Suspect of some BPM polarity inversion (already fixed by BI-PI?)

LINACs SEM grids

LINAC2 and LINAC3

- HW check-out ok
- FESA devices definition and OP-GUI not completely ready at start-up
 - Took little time to find correct timing
 - Some wrong mapping of wires
 - All ok now

LINAC3 ITL.MSF03HV after start-up

- Got stuck few times
- Problem: magnetic switch not detecting pneumatic piston OUT
 - Change with available spare, worked few days then again same problem
 - Slightly Moved switch w.r.t. piston → looks ok now, to be followed up

LBS SEM grid (I)

- During HW commissioning: High noise detected
 - BI-PM cleared cabling and groundings
 - Big improvement (R.Scrivens dixit)
 - With beam: still doubts about S/N → change from linear to integrating amplifier
 - BI-SW adapted FESA class to integrating amplifier
 - (Gate on signal – gate on no-beam): it works
 - Gate change from protons to ions still in FESA class, to be implemented in OP-GUI
- Tilt angle to change resolution (effective wire distance)
 - Some doubts on absolute angle change (depends on mechanical position of switches)
 - To be checked with beam

LBS SEM grid (II)

At start-up:

- Wiring problem:
 - Wire mapping (mechanics+electronics+SW) showed inconsistency
 - Looks everything is fixed

Elogbook - 16-Sep-2014

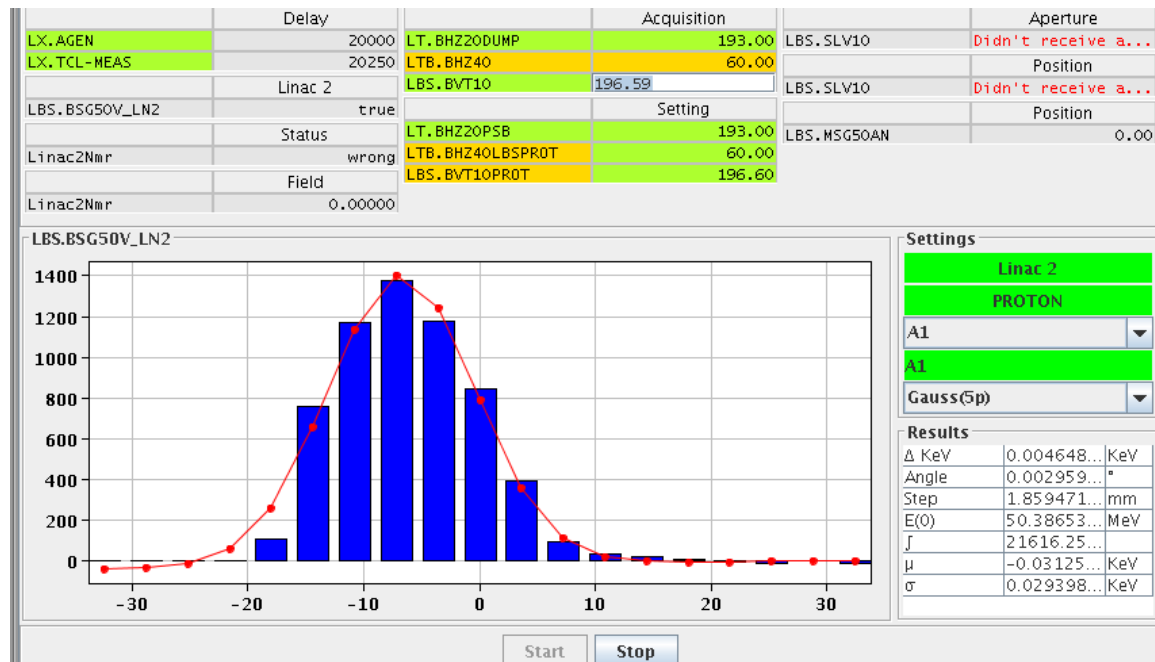
Test the LBS application.

Beam moves on the grid when changing the LBS.BVT10.

No acquisition from the Linac2Nmr.

D. Oberson will have a look at the probe.

[JBL]



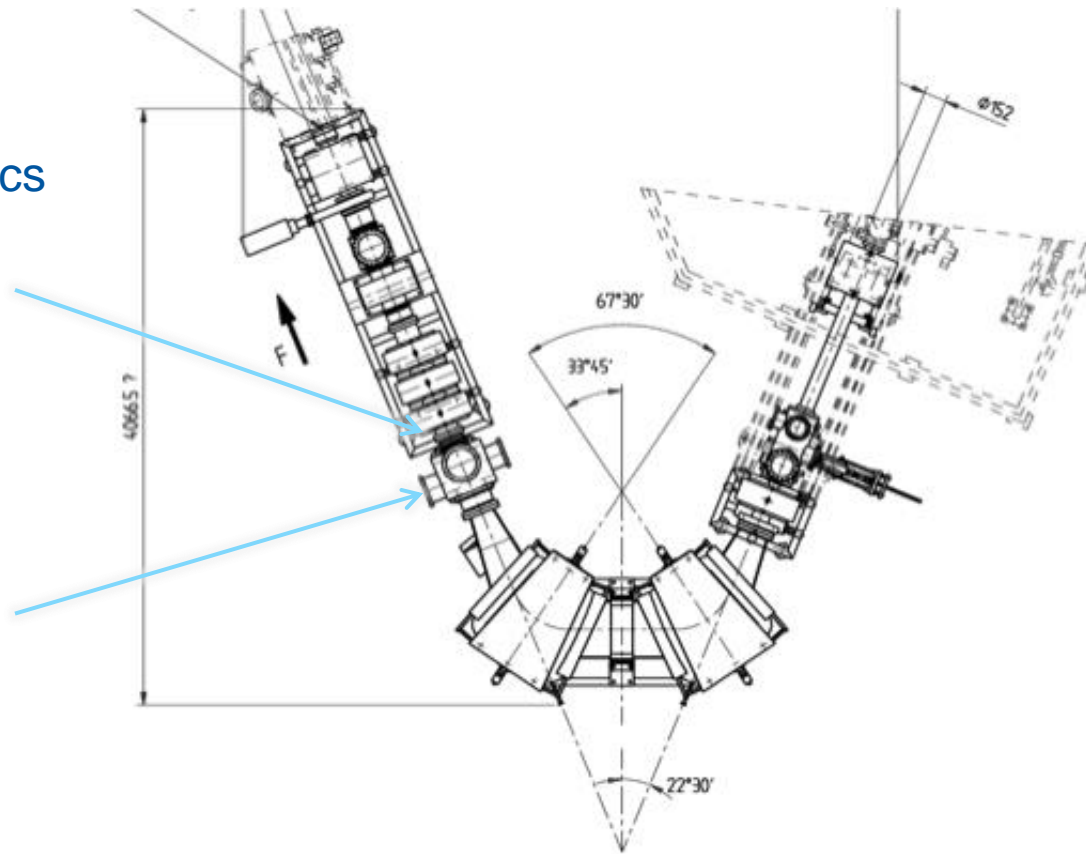
New Pepper Pot @ Linac3

- Purchased from Pantechnik

New diagnostics
tank hosting

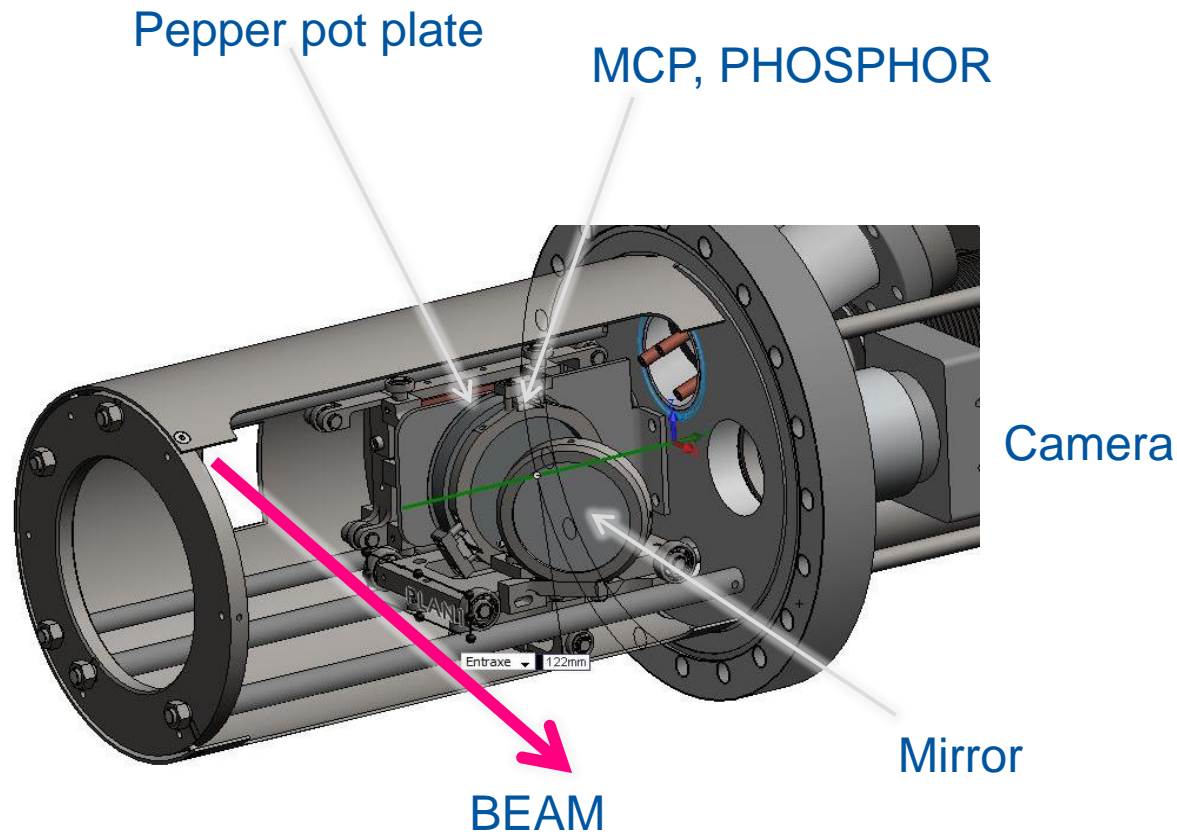
- Slit
- Pepper Pot
- FC

Pepper Pot



New Pepper Pot @ Linac3

- Here in the parking position

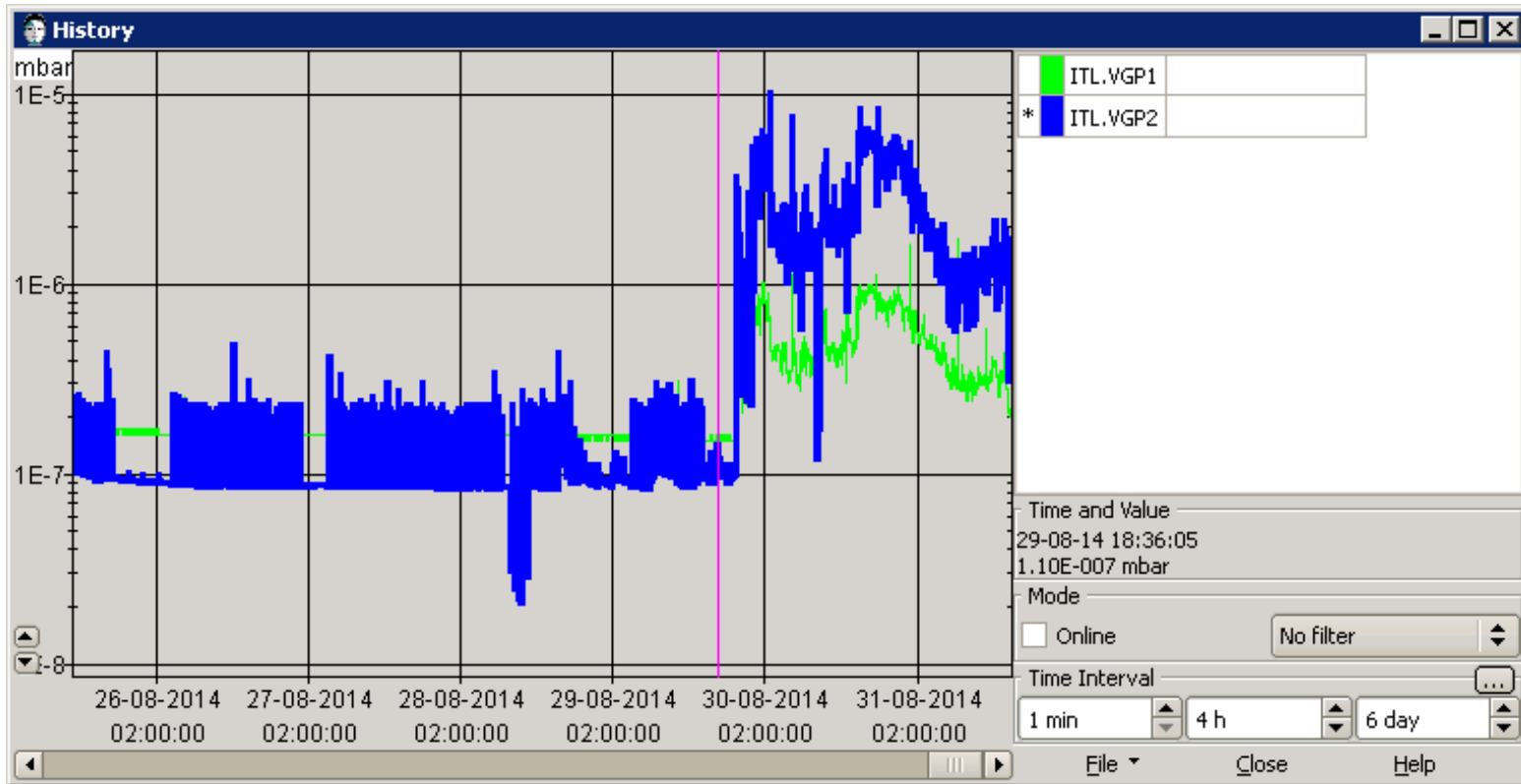


Pepper Pot Status

- New tank installed in July (equipped with slit and FC, no pepper pot detector)
- Pepper Pot detector installed Aug 22nd
- Aug 28th: Few tests with beam from 10 to 12 a.m., then detector @parking
- Aug 29th: @ ~9p.m. abrupt change of LEBT vacuum (see next slide)

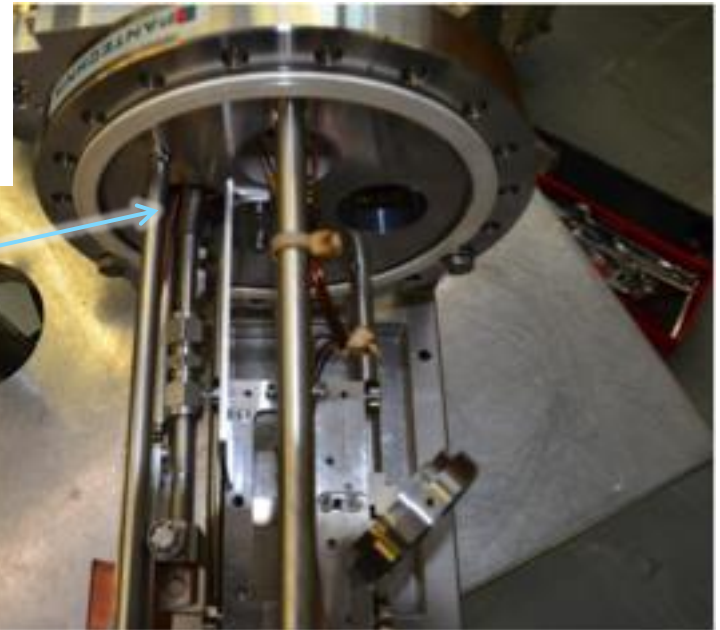
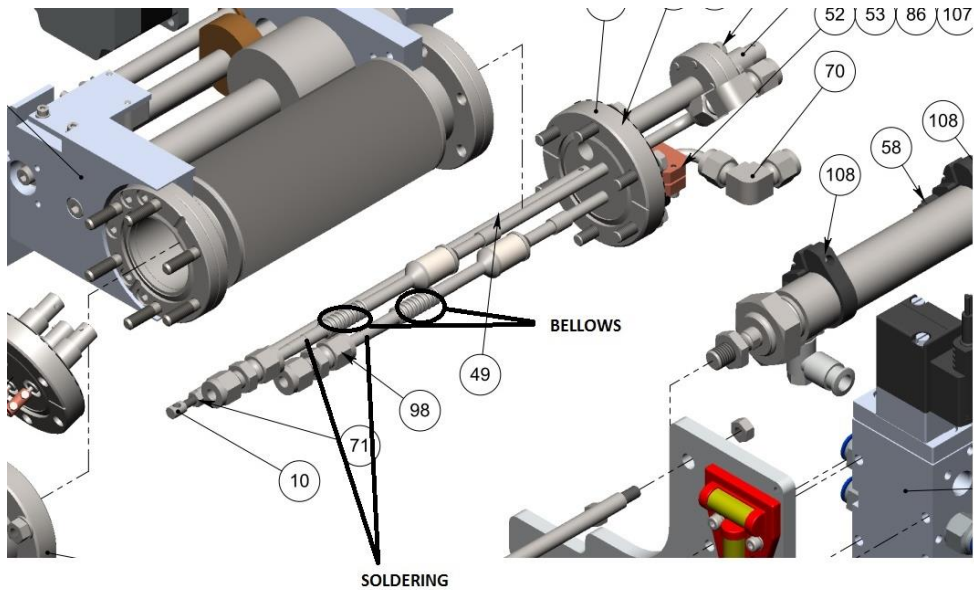
Pepper Pot

LEBT vacuum Aug 29th (A.Michet)



Problem traced back to leak along pepper pot plate cooling circuit

Pepper Pot - Cooling circuit



Bellow
clearly not
straight

Pepper Pot - Leak tests

- Panttechnik before delivery:
 - leak rate $< 1 \cdot 10^{-9}$ mbars.l.s⁻¹
 - TE-VSC (A.Michet) before installation (meas in the lab, pressurized He):
 - Leak rate $2.3 \cdot 10^{-10}$ mbar.l/s at 4 bars and $3.7 \cdot 10^{-10}$ mbar.l/s at 5 bars
 - TE-VSC (A.Michet) on Sep 1st after LEBT vacuum deterioration
 - Leak rate $\sim 10^{-4}$ mbar.l.s⁻¹ (meas in situ, pressurized He)
 - TE-VSX (A.Michet) on Sep 8th after detector removal from the tank
 - Cooling circuit put under vacuum ($\sim 10^{-8}$)
 - Injection of He around cooling circuit bellow
 - Pressure up to $\sim 10^{-6}$ mbar.l/s
- w/o dismounting cooling circuit is difficult to identify exactly where the leak is

Pepper Pot - Plan

- Detector sent back to Pantechnik for inspection and reparation
 - They have a spare bellow
 - Delivery back to CERN estimated in 2-3 weeks
 - Keep 1 year guarantee valid

Post Mortem summary

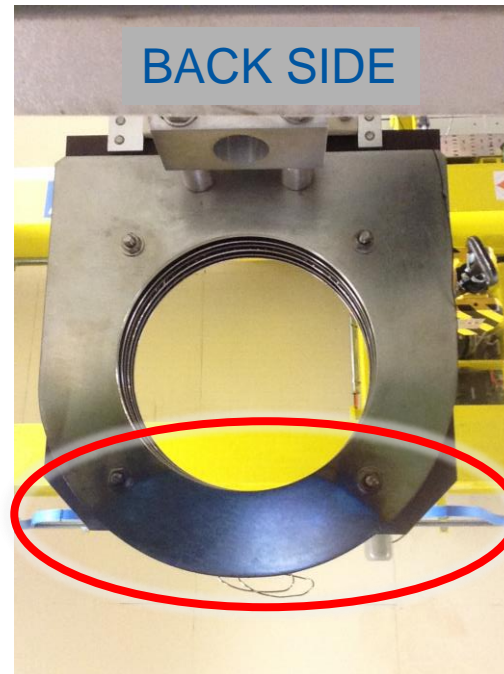
- LS1 work + HW commissioning + Cold check-outs
 - were performed mostly successfully but didn't identify all issues occurred during commissioning
- Some of the issues looks to me related to misunderstandings / not clear responsibility assignments among different groups/teams and not strictly a BI problem
- I learned some of the issues only while preparing this TB
- I personally learned some lessons with the Pepper Pot project ...

Issues pending from before LS1

LINAC3 SEMGRID ITL.MSF03HV (I)

Looks like beam trajectory depends on SEM grid IN or OUT

Visual Inspection Sep2014:



Vacuum team inspection March 2014:

https://dfs.cern.ch/dfs//Departments/AB/Groups/BI/Sections/PM/Projects/LINAC3/ITL.MSF03HV_PICS_22Aug2014/Cote SEM grid avt nett.avi

LINAC3 SEMGRID ITL.MSF03HV (II)

- Grid is clearly sticking into the beam pipe aperture when in the parking position
- Frame and/or bias plates hit by ions and gets charged
 - confirmed by beam-based (quick) tests
 - can improve discharge (now done through HV power supply)
 - Likely requires mechanical design change
 - longer shaft
 - Protecting (dischargeable) plate?

LINAC3 FCs

- BE-ABP recognized hints of secondary electrons showers (from losses on beam pipe?) reaching the cup sensor → unexpected negative peaks
- Offer from Pantechnik for two cups equipped with additional 'electrons shielding'
 - BI-ML: they do not fit into existing tanks
- BI-ML + BI-PM to decide for in-house design or outsource detectors fitting into tanks