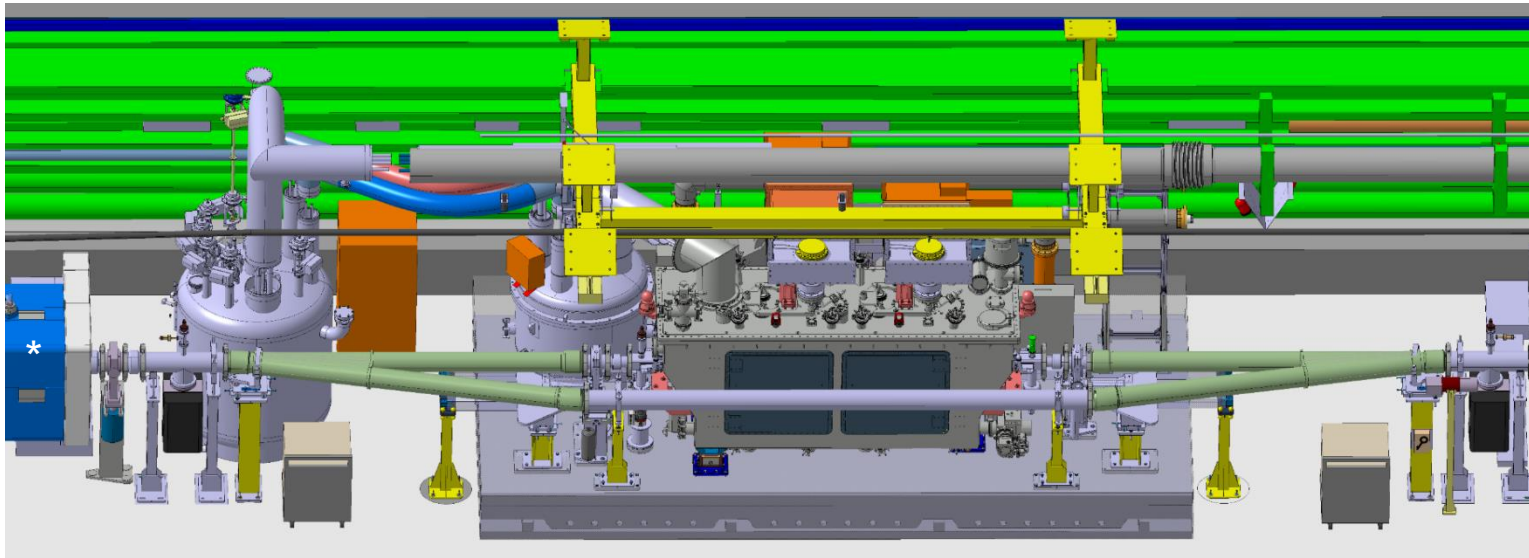


Crab Cavities SPS MD day: vacuum aspects

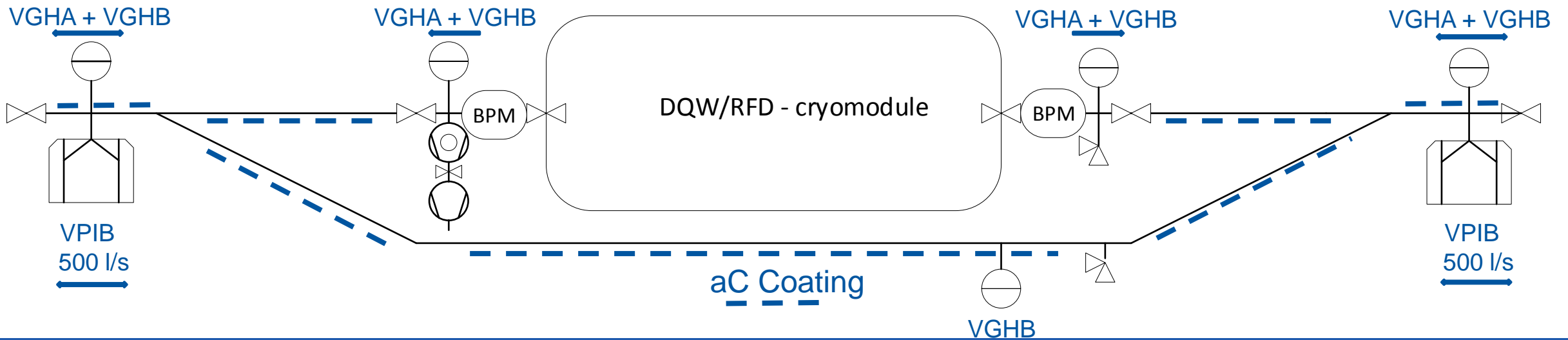
C. Pasquino, A. Gutierrez, J. Perez Espinos, G. Bregliozzi, V.
Baglin

Crab Cavities teststand in SPS: Integration



Why carbon coated?	aC coating	NEG coating
e- cloud suppression	✓	✓
Final static pressure (mbar)	$\approx 1 \cdot 10^{-9}$	$\approx 1 \cdot 10^{-10}$
Saturation	X	✓
Bake -out (activation)	X	✓
Mechanical integration	Conical flanges	CF
Intervention time (vacuum)	≈ 30 h	\approx a week

CRAB in LHC : NEG coated



Crab Cavities teststand in SPS:YETS Installation



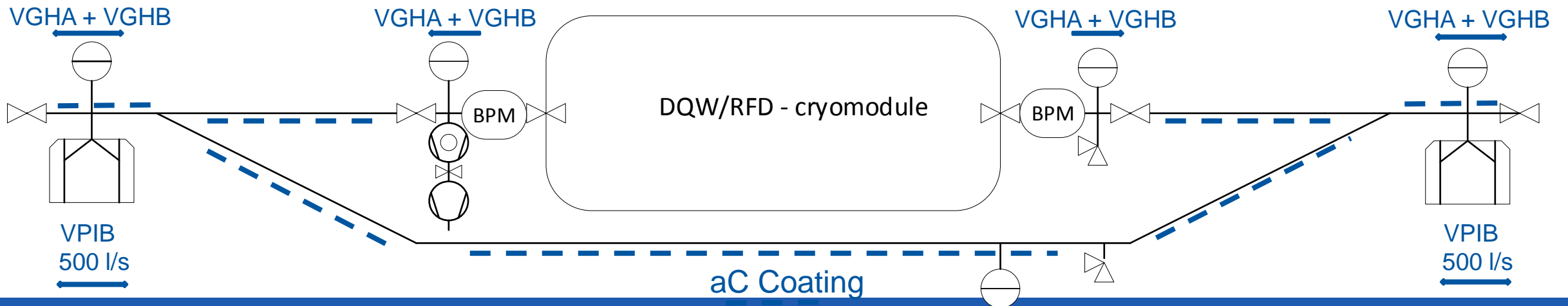
aC coating deposition



Mechanical installation



Interlock checks



Crab Cavities teststand in SPS: vacuum controls and interlocks

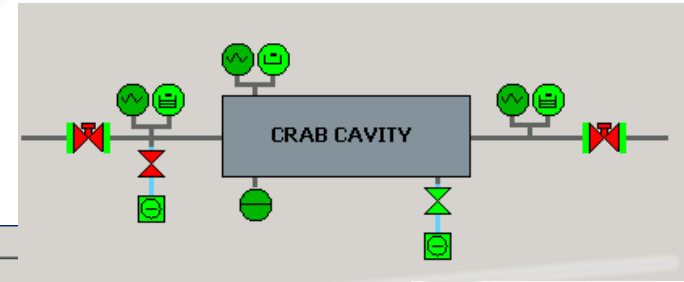
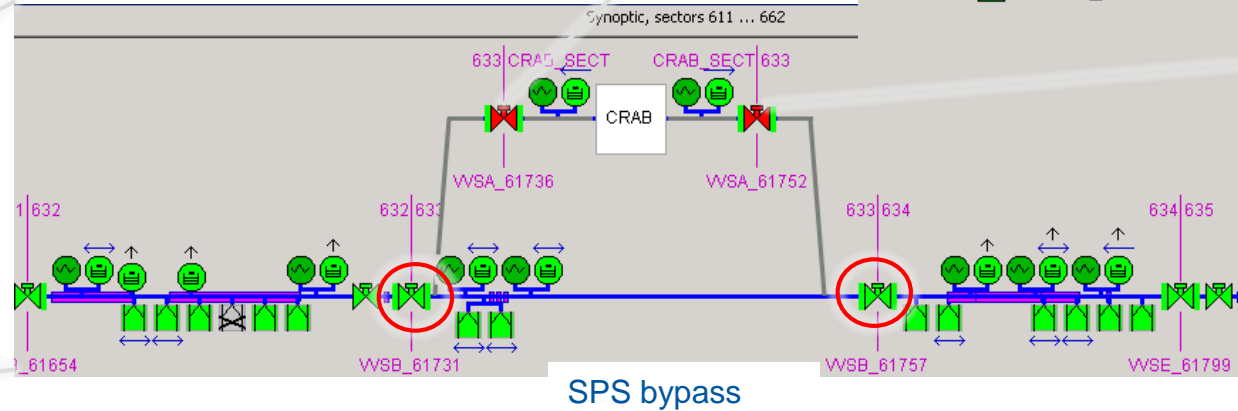
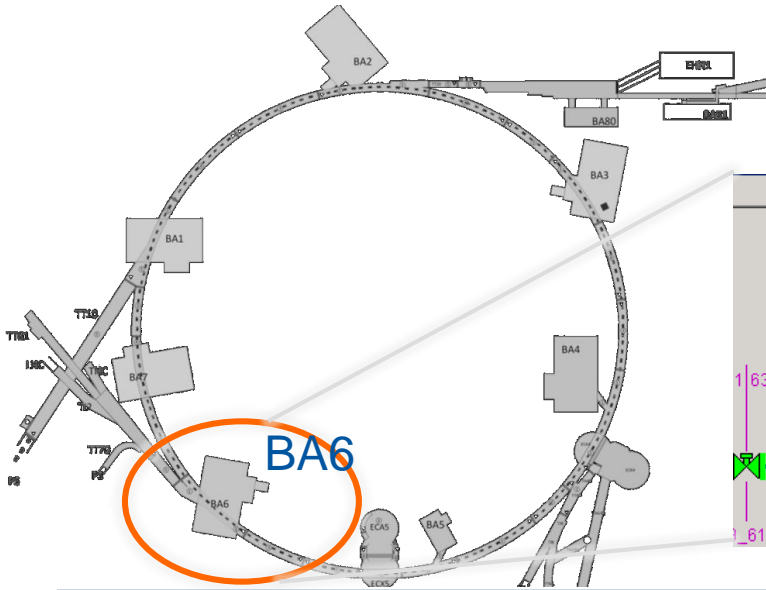


Table position – vacuum valves interlock interfaces:

- The table is allowed to move only if the SPS bypass valves and the CC sector valves are closed;
- Once the table is in IN position, all valves can be opened;
- If the table is in middle position, the valves are not allowed to be open;

Additionally, as per all sector valves in the SPS, penning gauges on both sides of the sector valves are interlocking the valves for pressure increases $> 1 \cdot 10^{-5}$ mbar.

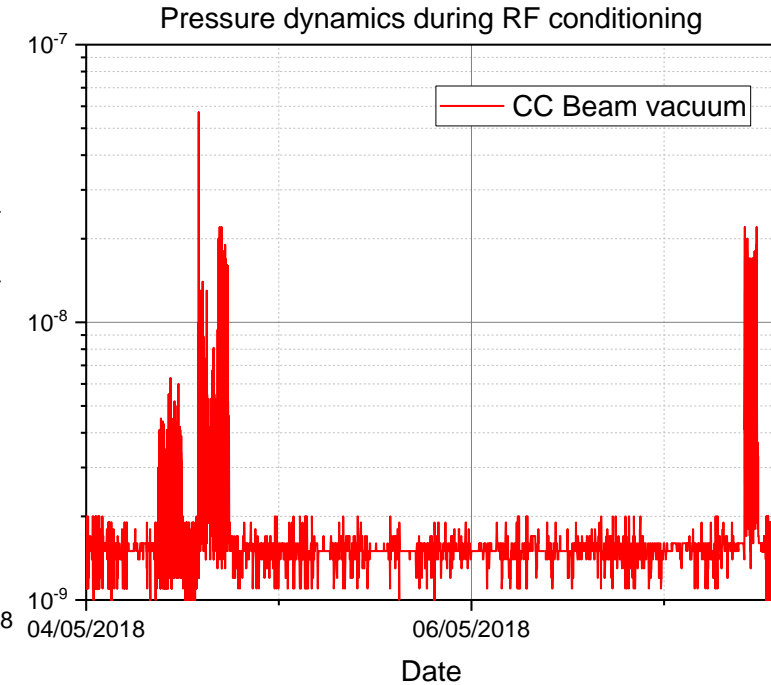
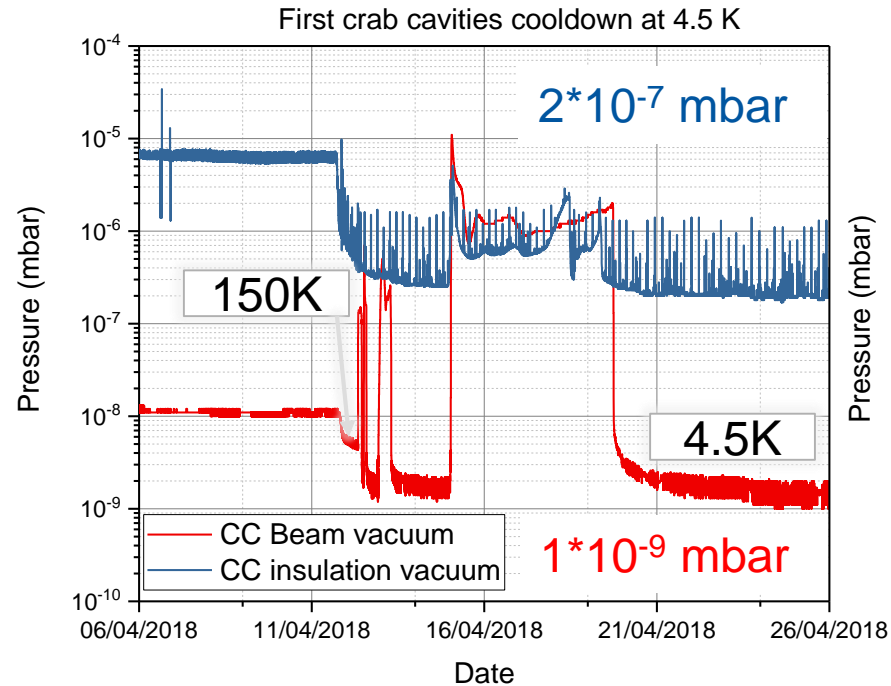
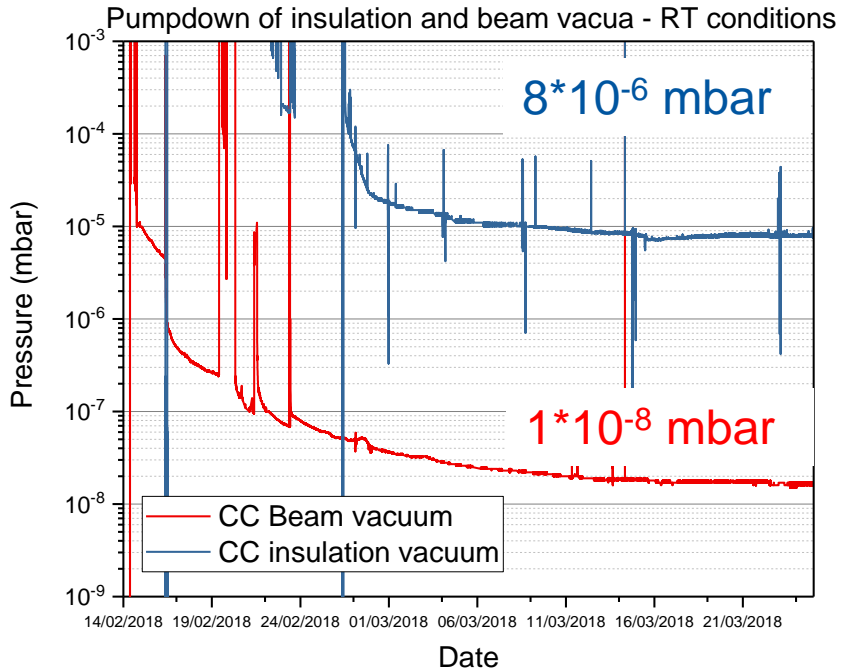
Still missing the temperature reading published on PVSS – Cryo input needed + PVSS update;

Pressure raw signals are used for Cryo interlocks – cables should be pulled during LS2;

Cables from the table switches should be pulled to read the position of the table.

Engineering specification describing all interlock interfaces with vacuum (RF systems, Cryo, Table position etc.)

Crab Cavities test stand in SPS: vacuum performance



Static pressure on the bypass and neighbouring sectors = 1-2*10⁻⁹ mbar

- Same procedure as in SM18:
- Cooldown at 150K with turbo pumping;
 - Isolation of the turbo at 150K;
 - Cooldown at 4.5 K;

Pressure dynamics during RF conditioning at 4.5 K of the cavities, seen by the vacuum gauges on beam vacuum.

Crab Cavities test stand in SPS: MD on the 2nd May

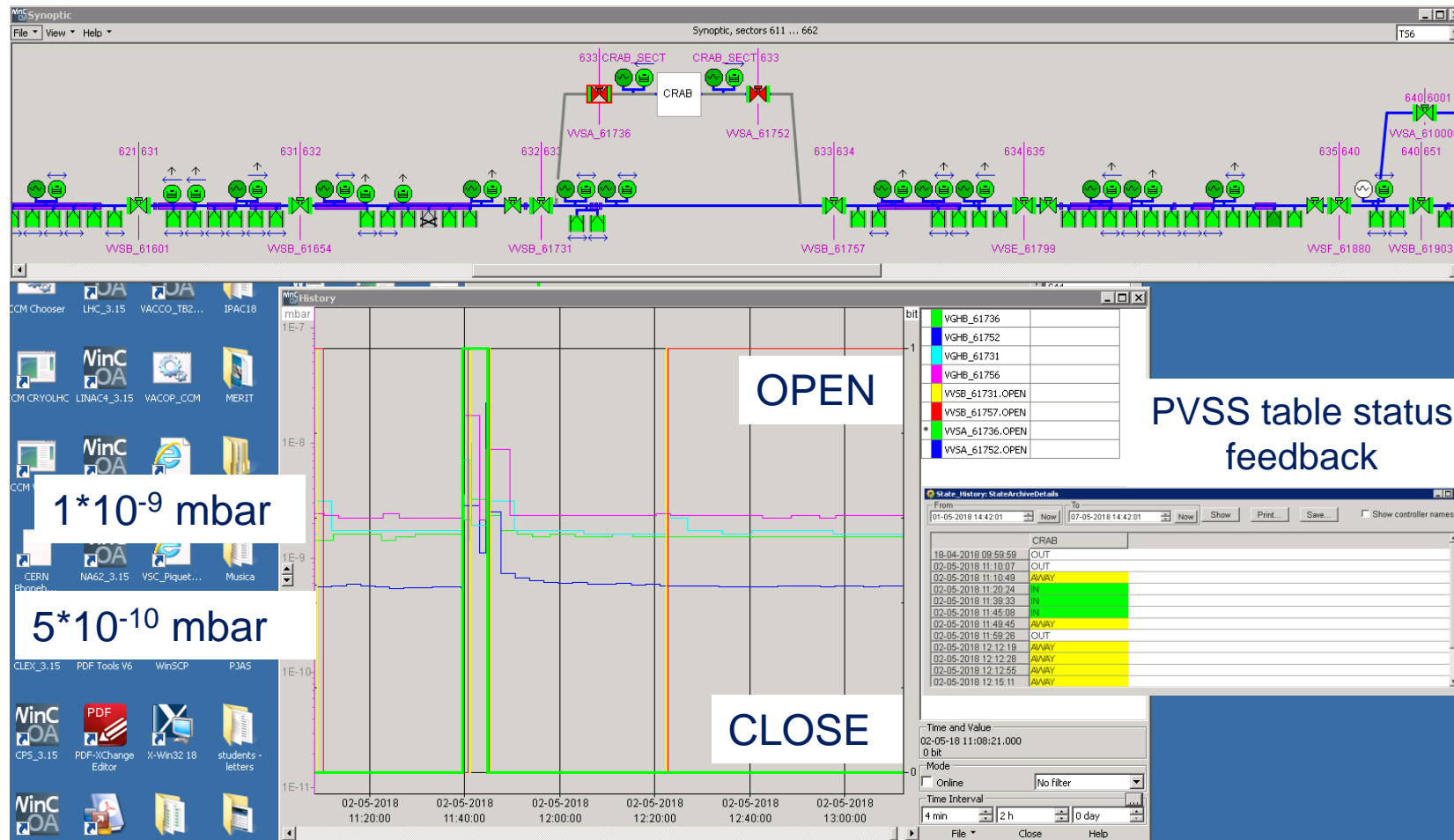


Table moved IN BEAM position in cryo conditions: the interlocks between sector valves and table positions have been successfully checked.

Sector valves sequence to move the cryomodule in beam position (MD):

1. Close VWSB_61731 and VWSB_61757;
2. Check VWSA_61736 and VWSA_61752 closed status;
3. Start the movement of the table, checking the pressure evolution both on gauges VGHB_61731 (bypass SPS) and VGHB_61736 (cryomodule).
4. Once the table in beam, open the VWSA_61736 and VWSA_61752, then VWSB_61731 and VWSB_61757.
5. Check the pressure on the beam line (reference $5 \cdot 10^{-10}$ mbar with Cryomodule at 4.5K, $1 \cdot 10^{-9}$ mbar on SPS)

Conclusions

- Vacuum installation in SPS is successfully completed and conform to the expected vacuum levels both for insulation and beam vacuum;
- Interlocks concerning valves and table positioning are all checked and fully commissioned;
- Pressure evolution during first beam at single bunch is expected to be very limited;
- Possible future MD: pressure degradation in the arcs for emittance blow-up studies;
- Looking forward to beam time!

SPARE SLIDES: pressure dynamics – single bunch Vs high intensity

