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The SPS Vacuum — how well do we know it? Could the SPS vacuum be improved?

R. Kersevan, C. Pasquino

CERN/TE-VSC

SPS LS2 main vacuum activities

LSS1 and **LSS5** reconfiguration due to the dump relocation;
LSS3: RF cavities upgrade;
LSS2: ZS reconfiguration (septa upgrade);
TPSC4, TPSG6, MSE exchange (septa upgrade);
Arcs: aC coating and **impedance reduction** at QF positions;
Arcs: Magnet campaign (34 main magnets);
Arcs: QD – MBB restriction (25 positions);
...;

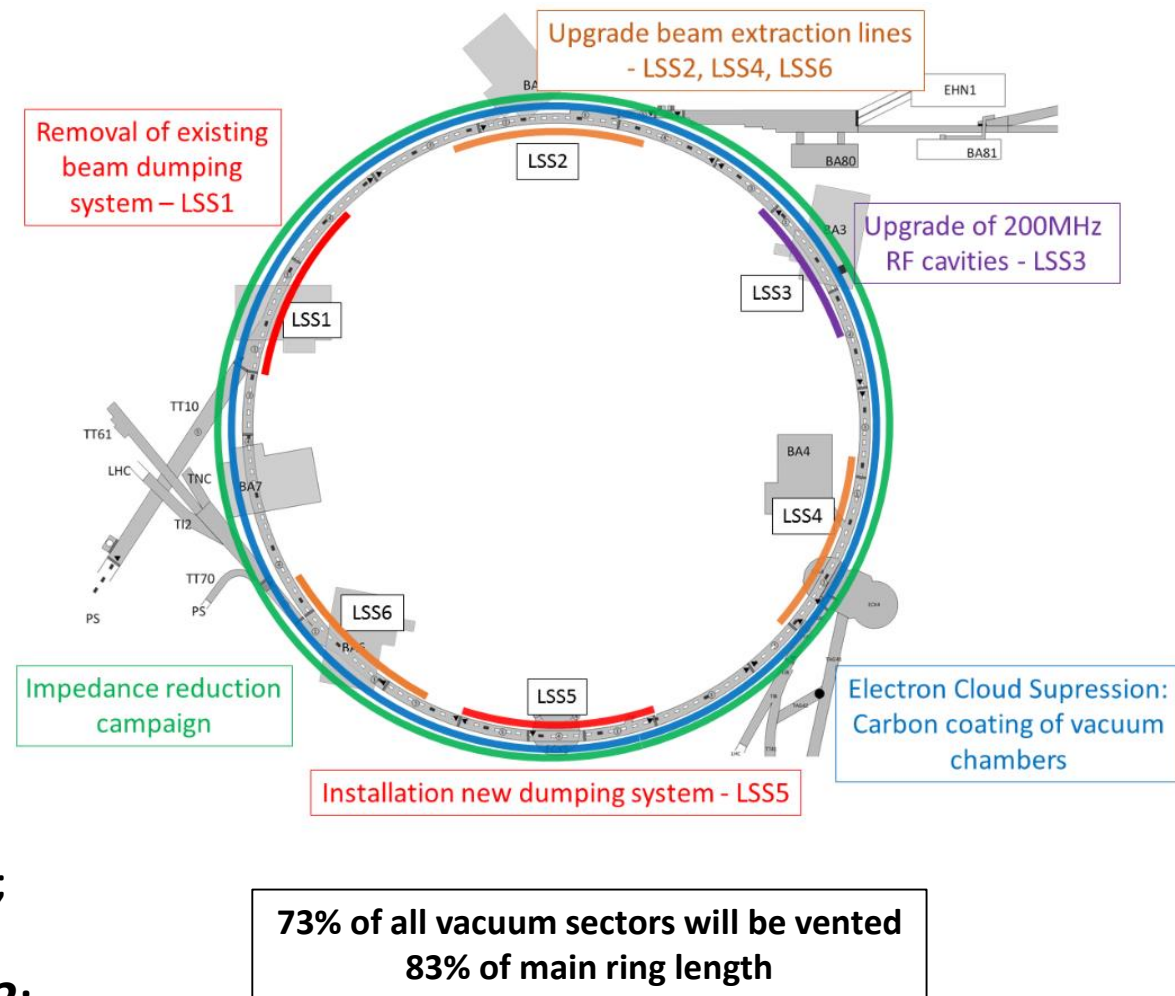
Amorphous-Carbon (aC) coating in LS2:

Drifts 159 : about 80m of machine;
SSS QF + QF : 87 positions, about 350m of machine;

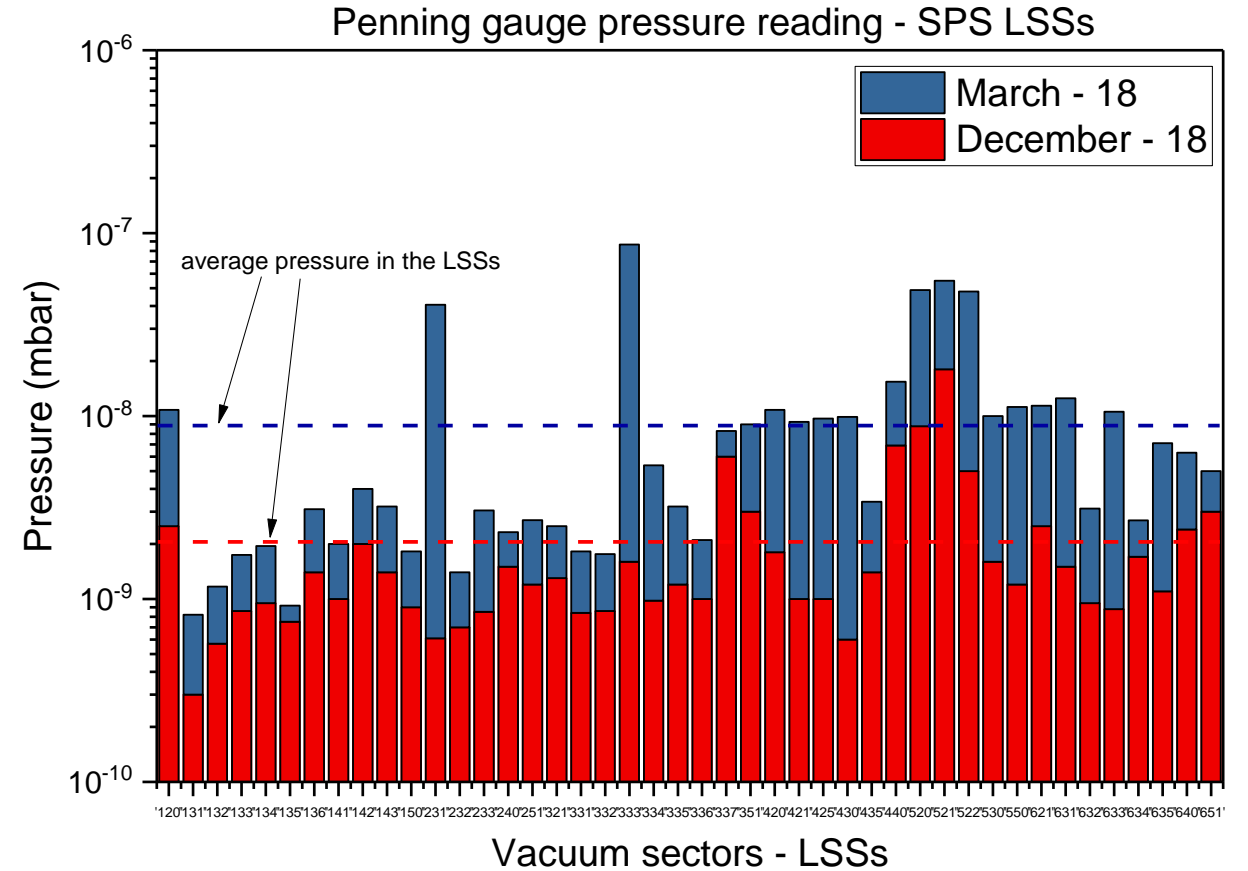
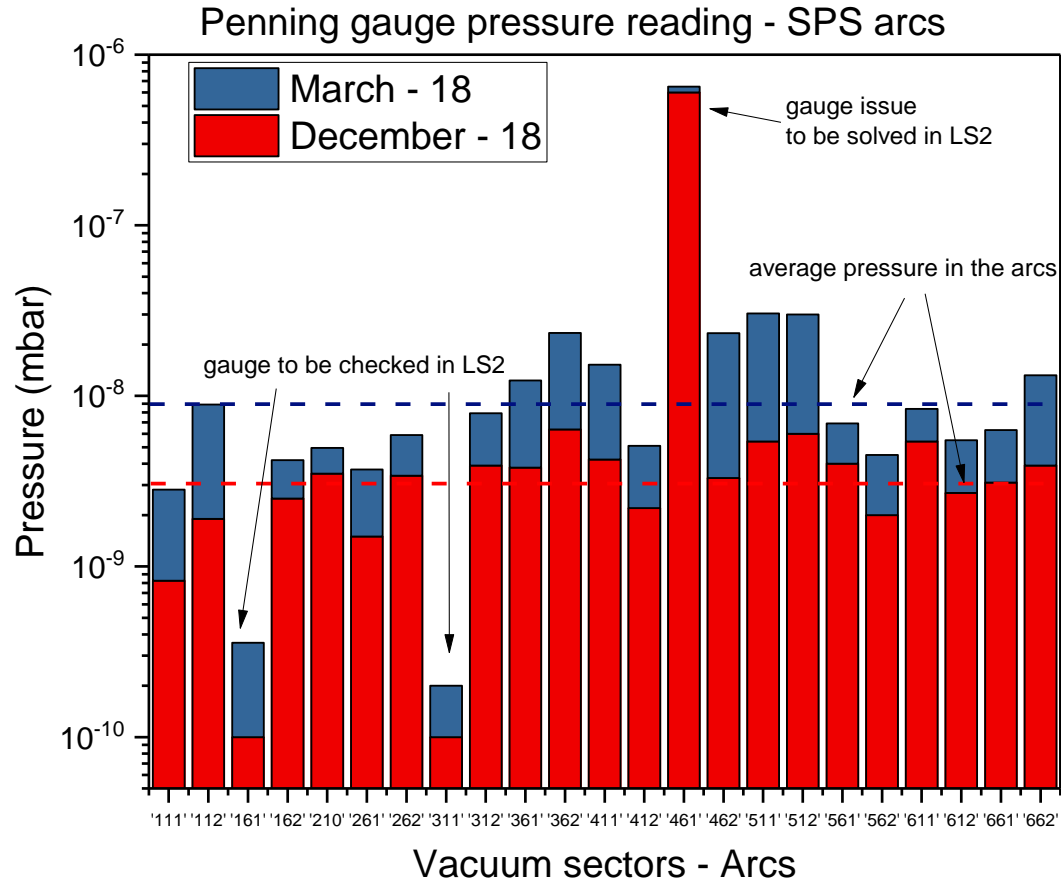
Previously done (LS1, EYETS16/17, YETS17/18):

Drifts 159 : about 20m of machine;
SSS QF + QF, SSS QD, MBB and MBA: about 300m of machine;

Total aC coated length of the SPS machine expected after LS2:
approximately 750 m, i.e. about 1/10 of the SPS ring length.



SPS static pressure profiles during 2018 run



Horizontal dashed lines: average pressures

Comments

- The new vacuum layouts are designed to have the same performance of the machine as before LS2: no improvements in the static pressure profiles are to be expected after LS2.
- Local improvements in the dynamic pressure profile should be expected thanks to the aC coating campaign at the QF positions. The static pressure profile will be affected by the presence of the aC coating and it will improve with the pumpdown time.
- During technical stops of 30h, some vacuum sectors in the SPS **could** be open for interventions.
- **Possible MDs needing a better vacuum should take place toward the end of the run or before TS2.**