

Abstract

96 accelerating modules with 768 TESLA / European XFEL type superconducting RF cavities were installed in the European XFEL LINAC tunnel (XTL) in fall 2016. Warm conditioning of the RF system - High/Low Level RF System and main input couplers - begun even before finishing the accelerator installation works. All modules were conditioned and tested prior to the installation in the tunnel in the AMTF test stand at DESY. Nevertheless, due to some repair activities on warm input coupler parts, warm conditioning was needed on a few modules/couplers. Cooling down to 2K begun in December 2016 and was finished in January 2017. Since then cold conditioning and tests are running. A few input couplers did have problems with conditioning and were disconnected, limiting otherwise the system performance. Some cavities in the modules showed multipacting (MP) effects, mostly because the cavity vacuum was vented with dry nitrogen for mentioned repairs on couplers in some modules. Such MP effects did appear in AMTF as well. All MP effects were successfully conditioned until now.

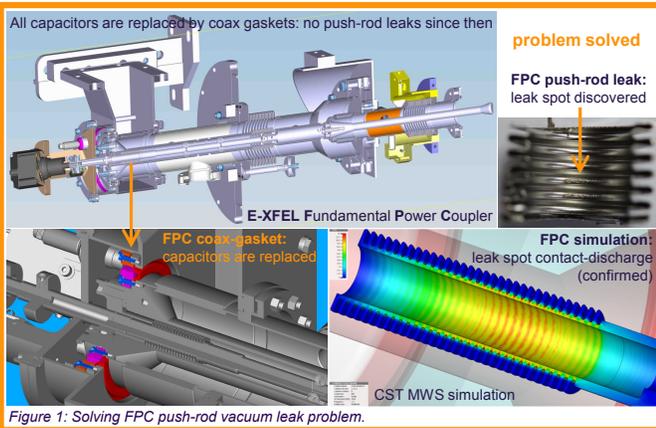


Figure 1: Solving FPC push-rod vacuum leak problem.

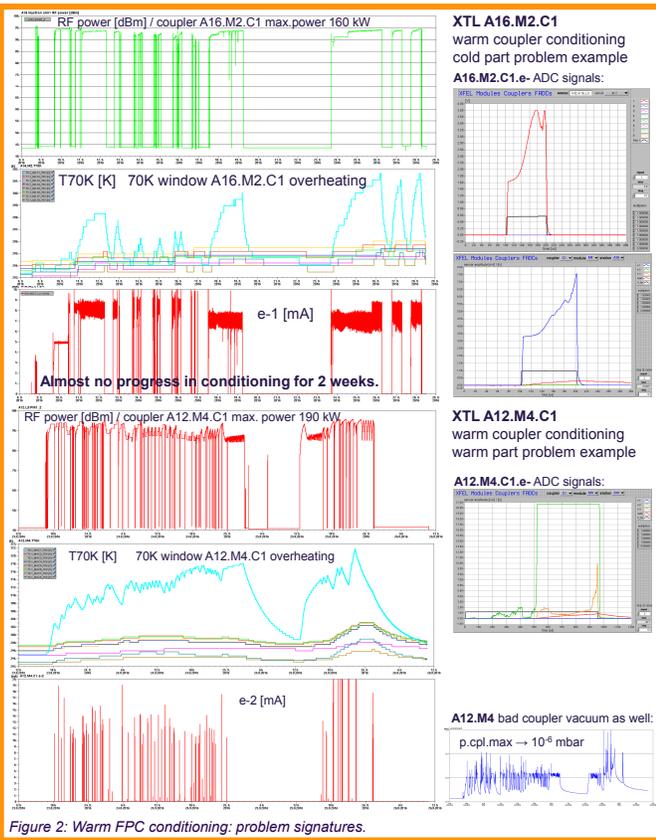


Figure 2: Warm FPC conditioning: problem signatures.

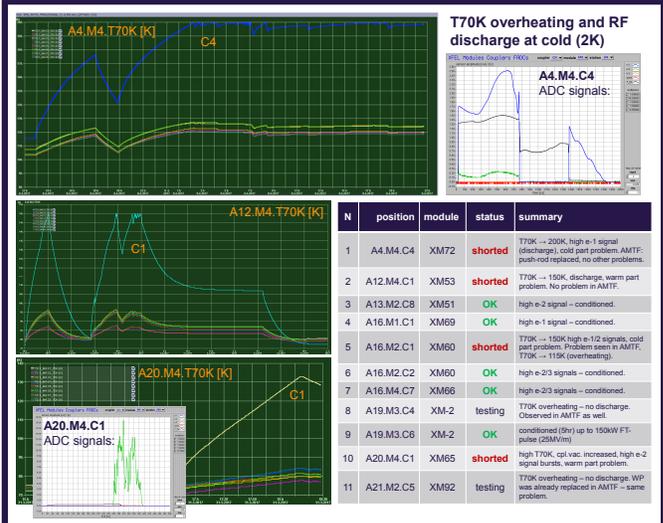


Figure 3: Cold FPC conditioning: problem signatures and summary table.

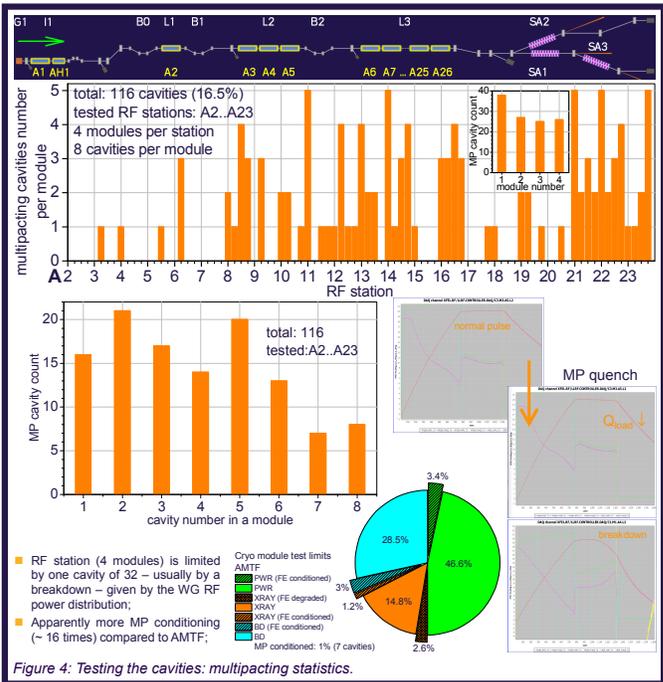


Figure 4: Testing the cavities: multipacting statistics.

Summary

- 96 European XFEL accelerating modules installed in the main linac tunnel (XTL), 4 modules are postponed.
- Technical Interlock (TIL) system is completed/installed and commissioned.
- All fundamental power couplers (FPC) capacitors were replaced by coax gaskets - no push-rod leaks anymore, problem well understood and fixed.
- Warm FPC conditioning is done with 64 modules (stations A2..A17). Cold FPC conditioning is done up to station A23 - 88 modules. Stations A24 and A25 (8 modules) are yet to be taken into operation.
- 4 FPCs are shorted (not used) because of the coupler problems - cold 70K window overheating, caused by the cold/warm part, coupled with not conditionable discharge, two more couplers show such effects - t.b.d.
- 88 modules are commissioned and accelerating the beam up to 14 GeV already and the last 8 modules (cryo-string 9) are still under commissioning. Some cavities did show multipacting effects during the commissioning.