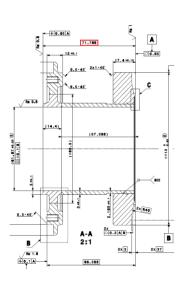
DQW- FPC/HOM Port Non-Conformities



Additional grooves on flanges for HOM coupler alignment



Machining mistake after weld on DQW #1 HOM port, an extra weld was introduced to address the length





Overlength in all HOM & FPC ports on both cavities +5 mm.

- ▲ i Fabrication, Assembly and Verification drafts & notes
 - a 📁 DQW Crab Cavities Cryomodule (SPS)
 - DQW Cryomodule Assembly
 - DQW Cryomodule Components
 - 4 🧔 DQW Dressed Cavities
 - DQW Dressed Cavities Assembly
 - a 🧔 DQW Bare cavities
 - 📁 Manufacturing drawings
 - Manufacturing procedures
 - Inspection & test procedures
 - Ø Qualifications
 - Manufacturing records

📁 NCRs

- HCACFCA004-CR000001 DQW Bare Cavity (variant #1)
- HCACFCA004-CR000002 DQW Bare Cavity (variant #1)
- 1597118 (v.1) MATERIAL CERTIFICATES. FABRICATION AT CERN 1685099 (v.1) Welding Book for the DQW Crab Cavity HCACFCA004.
- ☐ 1005099 (v. 1) Weiding Book for u
 ▷ ☐ 1758382 (v. 1) TEST REPORTS
 - 1759327 (v.1) METROLOGY REPORTS

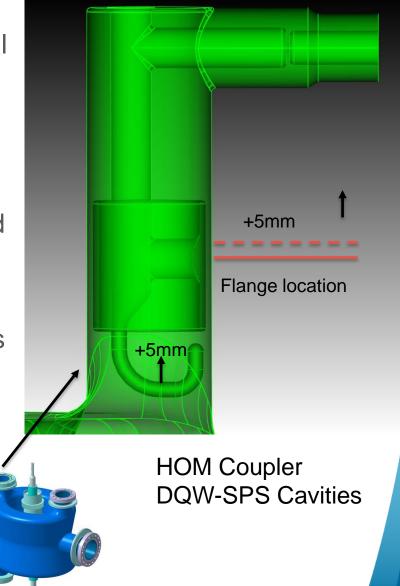
Non-conformity reports (EDMS/MTF)



Effect of HOM Port Non-Conformity

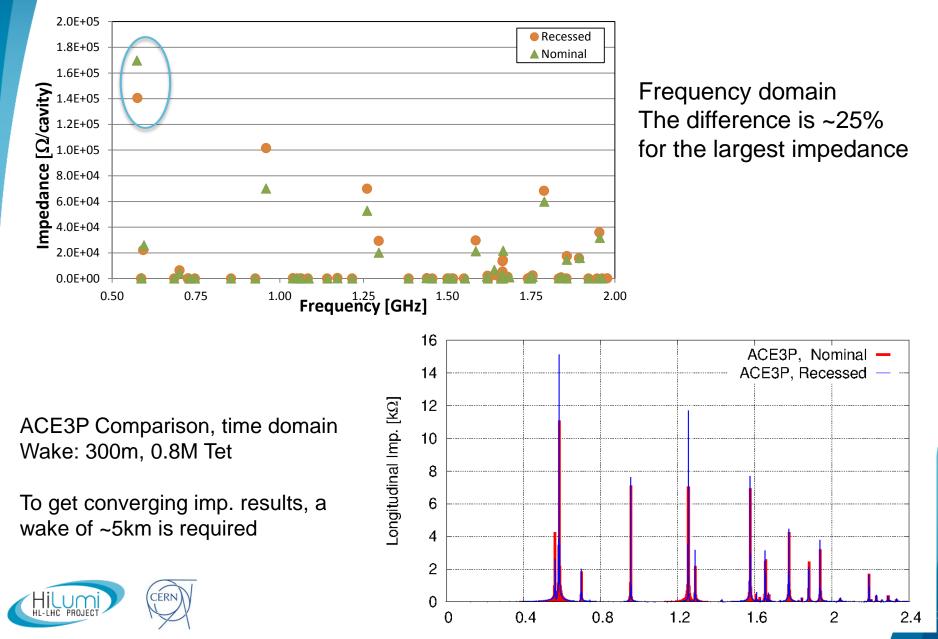
- Cavity flange +5 mm above the nominal position
- Possible impact on gasket heating & impedance
- Impact on the gasket heating calculated by BNL (B. Xiao): 4 mW → None
- Based on simulations, the max impedance increase < 30%, no effect is anticipated in SPS.

Decision: Proceed with current length for HOM Ports





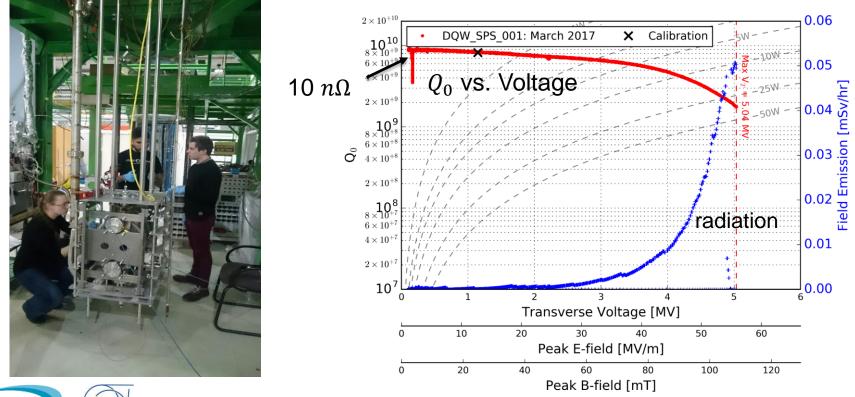
Longitudinal Impedance Comparison



Q_0 vs. Voltage

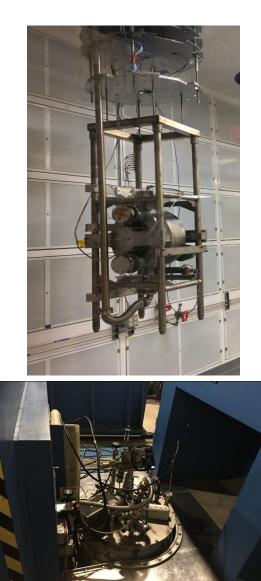
Excellent result in first test $V_T = 5.0$ MV (Nominal $V_T = 3.4$ MV) E_p , $B_p = 57$ MV/m, 104 mT (CERN DQW #2 RF testing next week)

Important aspect is to preserve through cavity dressing. Also to determine a performance target (margin) for series production*



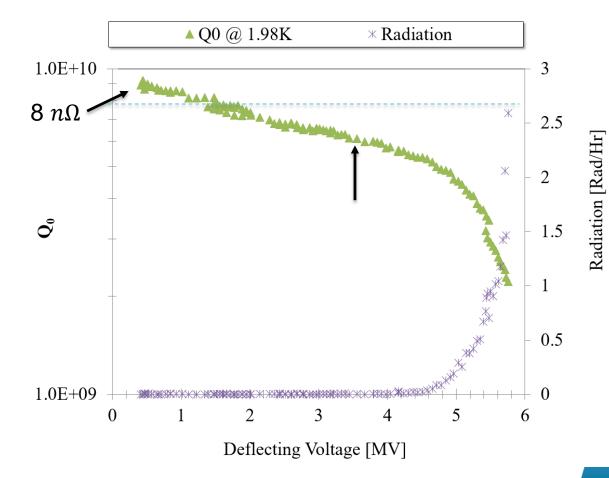
HILUMI CERN *US

*USLARP want this performance target now for CD1 review



USLARP-DQW #1

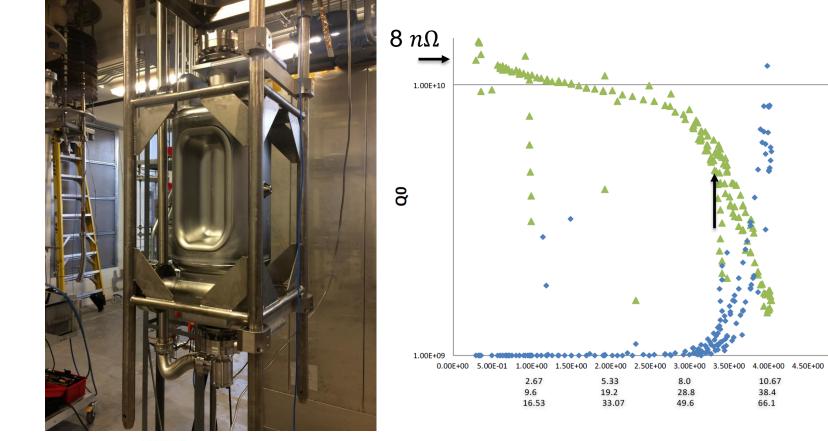
Best field and Q_0 achieved so far $V_T = 5.76$ MV E_p , $B_p = 63$ MV/m, 123 mT



USLARP DQW #2 testing foreseen soon

USLARP-RFD #1

Suspicion for an earlier quench (4 MV) of inadequate chemistry after the final welds, being re-processed and test in coming weeks





USLARP RFD #2 ready for testing as well

8.00E+01

7.00E+01

6.00E+01

5.00E+01

4.00E+01

2.00E+01

1.00E+01

0.00E+00

Vt (MV)

Et (MV/m)

Ep (MV/m)

Bp (mT)

5.00E+00

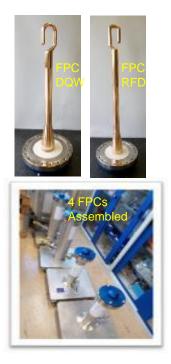
13.33

48.0

82.7

▲ Qo 3.00E+01 ◆ Radiation

Power Coupler Conditioning





30 kW CW on a load (thermal limitation due to the test box in stainless steel).

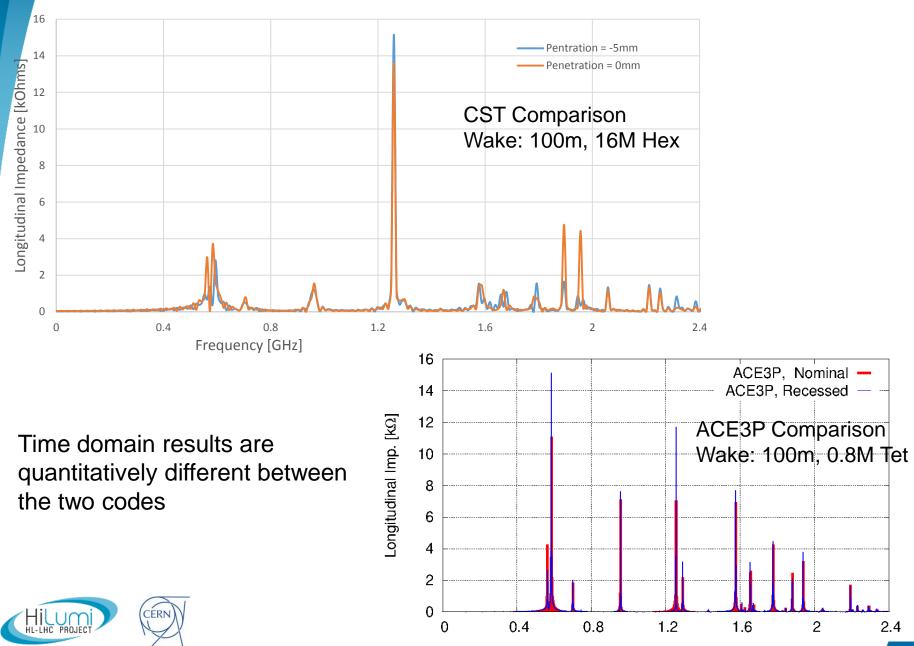
75 kW pulsed up to 10 ms @52.6 Hz

75 kW, 500 μs @10 Hz on a short circuit at all phases over $\lambda/2$ (equivalent to 300 kW peak, limited due to the RF power)

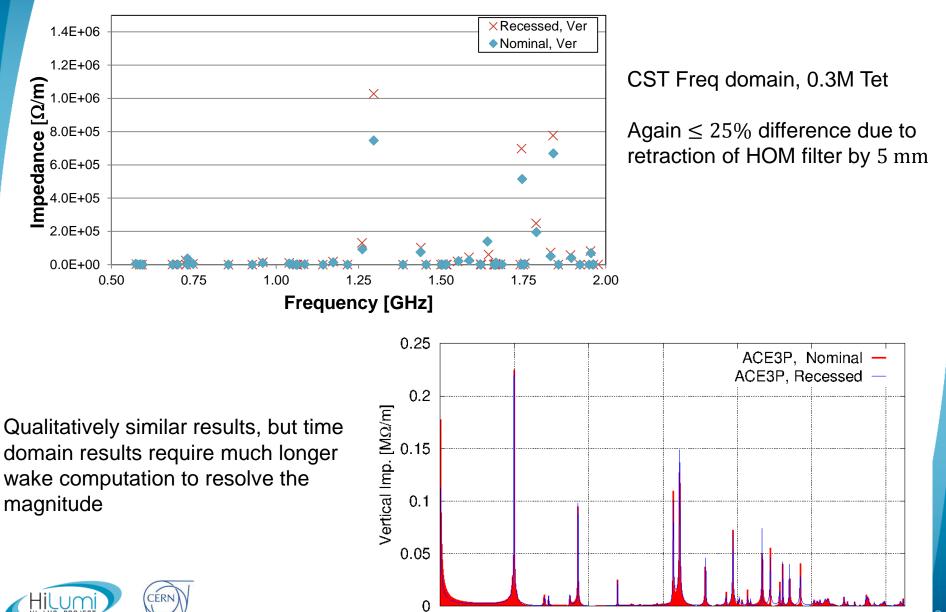


Vac Input 1.0 e-8 3.522949 17.27.55kW / fe-8 Vac Output 8.3 e-9 3.430175 17.46.58kW / 4e-8 Vac. Auto RF OFF Ramping Reset 17.43.58kW / 4e-8 Vac. Auto RF OFF Ramping 1.43.58kW / 4e-8 17.43.58kW / 4e-8 Monte jusqu'à 70 kW 5.0 5.0 5.0 Flat Top 20 sec. 5.0 17.45.01kW / 3e-8 Flat Top 20 sec. Fast delay 0.15 sec.	
Vac Output 8.3 e-9 3.430175 17.40:63kW / 4e-8 Vac. Auto RF OFF Ramping Reset 17.42:63kW / 4e-8 Monte jusqu'à 70 kW 5 17.43:53kW / 5e-8 17.43:53kW / 5e-8 Flat Top 20 sec. Stow Delay 0.15 sec.	
Vac. Auto RF OFF Ramping Reset 17.42 65KW / 4e-8 Monte jusqu*à 70 kW Att. max.: 17.43 65KW / 4e-8 Monte jusqu*à 70 kW 5.0 5.0 5.0 25 Dec 17.46 Reset Flat Top 20 sec. Stow Delay 0.15 sec. 17.43 6.0 KW / 3e-8	
25 Dec 17.46 - Heset 5 Flat Top 20 Stow Delay 0.15 sec.	
	alarmes
Change 52 kW Fast delay 0.05 sec.	
ast minute Maximum Auto up to : Pmax limit :	
P Input U	
P Output 0002441	

Longitudinal Imp, Code Comparison



Vertical Impedance



0.4

0

0.8

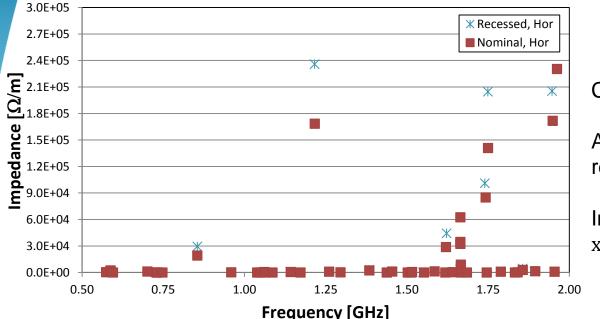
1.2

1.6

2

2.4

Horizontal Impedance Comparison



CST Freq domain, 0.3M Tet

Again $\leq 30\%$ difference due to retraction of HOM filter by 5 mm

Impedance in horizontal smaller by x5 or more compared to vertical

Qualitatively similar results, but time domain results require much longer wake computation to resolve the magnitude



