

# FCC RF R&D Coordination Meeting 3

Olivier Brunner, 9/12/2015

# Agenda of the day

- Minutes approval, follow-up from last meeting (O. Brunner) 10'
- Report from coordinator (E. Jensen) 10'
- Progress reports from all task leaders 20'
- Report from fellow activities 5'
- Specific reports
  - Preliminary program for Rome(15')
- Tour de table 15'
- AOB 5'

Next meetings:            January 20  
                                 February 17  
                                 March 16

RF R&D Review: 1,2 March 2016 (tbc)



# WP News (1)

- New version of the document (see indico)

<i>Table of Contents</i>	
<b>1</b>	<b>RF SCENARIOS AND PARAMETERS LAYOUT (A.BUTTERWORTH) ..... 4</b>
1.1	RF SCENARIOS AND PARAMETERS LAYOUT FOR FCC_EE ..... 4
1.2	RF SCENARIOS AND PARAMETERS LAYOUT FOR FCC_HH ..... 5
1.3	CAVITY DESIGN – TO BE STREAMLINED TO COPE WITH 1.1 & 1.2 (ACTION: RAMA) ..... 6
1.4	CAVITY IMPEDANCE AND HOMS ..... 7
<b>2</b>	<b>COLLABORATION AGREEMENT CERN/ROSTOCK UNIVERSITY (ADDENDUM FCC-GOV-CC-0038, KE2906) (F. GERIGK) ..... 8</b>
2.1	ACCELERATING CAVITY DESIGN AND HOM COUPLERS ..... 8
2.2	2ND HARMONIC CAVITY DESIGN AND HOM COUPLERS ..... 10
<b>3</b>	<b>CAVITY MATERIAL AND PERFORMANCE (WALTER VENTURINI DELSOLARO) ..... 11</b>
3.1	SUPERCONDUCTING MATERIAL DEVELOPMENTS ..... 11
<b>4</b>	<b>COLLABORATION AGREEMENT CERN/LNL/STFC (KE2722/BE/FCC) (P. CHIGGIATO)..... 13</b>
4.1	FRAMEWORK FOR SCIENTIFIC COLLABORATION IN SUPERCONDUCTING RF CAVITIES TECHNOLOGY ..... 13
<b>5</b>	<b>CAVITY FABRICATION (KARL SCHIRM)..... 16</b>
5.1	CAVITY FABRICATION..... 16
5.2	HIGH VELOCITY FORMING OF SUPERCONDUCTING RF STRUCTURES..... 17
<b>6</b>	<b>CRYOMODULE CHALLENGES (KARL SCHIRM) ..... 19</b>
6.1	CRYOMODULE DESIGN..... 19
6.2	FUNDAMENTAL POWER COUPLERS ..... 20
6.3	CRYOMODULE DESIGN..... 21
<b>7</b>	<b>LLRF SYSTEM (W. HOFLE)..... 22</b>
7.1	FAST CAVITY FEEDBACKS FOR COUPLED BUNCH MODES. CAVITY TRIP HANDLING – IMPEDANCE MITIGATION ..... 22
<b>8</b>	<b>EFFICIENCY OF RF POWER GENERATION (TBD)..... 23</b>
8.1	DEVELOPMENT OF VERY HIGH EFFICIENCY KLYSTRONS ..... 23
8.2	VERY HIGH EFFICIENCY KLYSTRONS WITH ADIABATIC BUNCHING ..... 24
	<b>ANNEX A- MANDATE OF FCC SRF WP ..... 26</b>

# WP News (2)

- Action list:
  - WP1 to be completed, detailed and merged with WP2, (Andy & Rama)
  - WP2: define & adjust goals, (Frank)
  - WP3: propose a break down version (Walter)
  - WP5.1 & WP6: complete and detail (Karl)



# RF R&D WP Review in March

- Main goals (my view!):
  - Agree on FCC\_hh RF system and FCC\_ee staging scenarios:

Phase 1: Reach the Higgs in first stage, Low Luminosity

- intermediate:  $\approx 2.2$  GV,  $\approx 25$  MW/beam

Phase 2: Reach the Higgs & the Z at nominal (see table previous page)

- Higgs, high Luminosity: 5.5 GV, 50 MW/beam, 30 mA

Z, high currents: 2.5 GV, 50 MW/beam, 1450 mA

Phase3: physics @175GeV

*The requirements vary considerably!*

- Define best compromise for phase 2 & 1?
  - What is the optimum system for the Higgs @ nominal?
    - What do we get for the Z pole?
  - What is the optimum system for the Z pole @ nominal?
    - Can we meet the requirements (1.45A, 16700 bunches, 3mm bl) ?
      - loss factor  $\approx 0.1$  achievable (single cell)
      - lower possible loss factor for 1, 2 4 cell cavities? (vs bunch length)
    - Impact on bunch length limitation?
- What is the optimum upgrade for phase 3? Common RF system for both beams? Add 800MHz RF system?

*Main goals of WP 2*

k (V/pC)	1	
Io (mA)	1450	
fo (kHz)	3	
nb	16700	
Phom	4.20E+04	W