



TE-VSC reporting to:

**Superconducting RF R&D coordination meeting
01**

on

CERN-LNL-STFC collaboration KE2722/BE/FCC

ARTICLE 2 Collaboration

- 2.1 It is intended that CERN's contribution to the collaboration shall include:
- a) RF design of the 5-cell 800 MHz cavities.
 - b) The supply of the High Purity OFHC Copper material required for the cavity forming in the size required by INFN.
 - c) Development, commissioning and operation of the full infrastructure for the niobium sputter coating of 5-cell 800 MHz copper cavities: surface processing, coating bench and RF test facility as described in more detail in [Annex 1](#).
 - d) A financial contribution as set out in [Annex 2](#).
- 2.2 It is intended that INFN's contribution to the collaboration shall include:
- a) The fabrication of four seamless 800 MHz 5-cell copper cavities, as described in more detail in [Annex 1](#).
 - b) The development of surface processing and coating techniques on seamless 6 GHz cavities, in view of a possible application to 800 MHz cavities, as described in more detail in [Annex 1](#).
 - c) For the achievement of these goals, INFN will be free to subcontract part of the work to Consorzio Futuro in Ricerca (CFR). CFR has been traditionally collaborating for years with INFN, through the support and coordination of students, scientific fellows, young researchers and foreign experts, that have contributed to the performance of R&D on superconducting cavities, in the framework of a Master Programme called "Surface Treatments for Industrial Applications" promoted by INFN and the University of Padua.
- 2.3 It is intended that STFC's contribution to the collaboration shall include:
- Microscopic and surface characterization of samples produced by the other parties, representing either routine or innovative surface preparation processes or coating as described in more detail in [Annex 1](#).

Meetings

- Kickoff meeting at CERN on 23.06.2015
 - Discuss the Laboratories capabilities, confirm common scope
 - Agree on planning, deliverables and milestones
 - List of short-term actions
- Follow up meeting in Whistler during SRF2015, 17.9.2015
 - Follow-up on actions
 - Discuss samples testing and analyses plan
- Next meeting not scheduled yet.
 - (yearly review meeting foreseen in collaboration agreement)



Planning

		2015				2016				2017				2018				2019				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
LNL	6 GHz cavities test of units 1 to 15			M1		D1																
	6 GHz cavities test of units 16 to 28						M2		D2													
	6 GHz cavities test of units 29 to 32										M3		D3									
	800 MHz cavities: toolings for production				D4																	
	800 MHz cavities: production of first cavity								D5													
	800 MHz cavities: production of cavities 2 to 4												D6									
	400 MHz cavity seamless fabrication feasibility study: engineering 400 MHz cavity seamless fabrication feasibility study: validation & cost									M4							D7					
STFC	Samples analyses for 6 GHz cavity studies					M5				M6						M7						
	Samples analyses for 800 MHz cavity studies													M7								
	Development of 3D Nb/Cu coating: design & procurement											D8										
	Development of 3D Nb/Cu coating: construction and commissioning															D9						
CERN	Specification drawing for 800 MHz cavities			M8																		
	Supply Cu OFE sheets for cavity manufacturing								D10													
	Design & manufacturing of surface treatments bench											D11										
	Design & manufacturing of coating bench											D12										
	Design & manufacturing of RF test bench											D13										
	Coating + RF test of first cavity																D14					
	Specification drawing for 400 MHz LHC-type cavity			M9																		

Milestones and deliverables

Milestones	Title	Responsible	Contractual date	Agreed date
M1	Interim report 1 on 6 GHz cavity studies	LNL	Q2	
M2	Interim report 2 on 6 GHz cavity studies	LNL	Q6	
M3	Interim report 3 on 6 GHz cavity studies	LNL	Q10	
M4	Interim report on 400 MHz cavity fabrication studies	LNL	Q8	
M5	Annual report on sample analyses	STFC	Q4	
M6	Annual report on sample analyses	STFC	Q8	
M7	Annual report on sample analyses	STFC	Q12	
M8	Specification drawing for 800 MHz cavity	CERN	Q1	31.8.2015
M9	Specification drawing for 400 MHz cavity	CERN	Q1	30.9.2015
Deliverables	Title	Responsible		
D1	Yearly status report on 6 GHz cavity studies	LNL	Q4	
D2	Yearly status report on 6 GHz cavity studies	LNL	Q8	
D3	Yearly status report on 6 GHz cavity studies	LNL	Q12	
D4	Production of tooling for 800 MHz cavity fabrication	LNL	Q4	
D5	Fabrication of first cavity	LNL	Q8	
D6	Fabrication of remaining cavities	LNL	Q12	
D7	Final report on 400 MHz seamless fabrication feasibility	LNL	Q12	
D8	Engineering design of coating bench	STFC	Q8	
D9	Production of first coated cavity	STFC	Q12	
D10	Cu OFE supply to LNL for manufacturing of 4 cavities	CERN	Q6	
D11	Completion of surface treatments bench	CERN	Q8	
D12	Completion of coating bench	CERN	Q8	
D13	Completion of RF test bench	CERN	Q8	
D14	Coating of first cavity prototype	CERN	Q12	

Short term actions

CERN

Launch a framework contract for the delivery of certified Cu-OFE up to a maximal value. -> **Available**

Supply Cu-OFE in 2mm or 3mm sheet to LNL for 6GHz cavities manufacturing -> **31.10.2015 agreed in Whistler**

Delivery of approved drawing of 800 MHz cavity to LNL (M8). **Deadline: 31.8.2015 -> 31.10.2015**

Work out a plan for production and testing follow-up and circulate. **Deadline: 31.8.2015 -> Discussed in Whistler**

Setup a tool for sharing of communication. **Deadline: 31.8.2015 -> 31.10.2015**

Ensure quick signature of Contract documents. **Deadline: 1.7.2015 -> see next page**

LNL

Provide a testing program, with relevant parameters, techniques, procedures, for 6GHz cavities, to circulate.

Deadline: 1.8.2015 -> Discussed in Whistler

Provide a request for size, quantity and thickness, of certified Cu-OFE for 6GHz cavities, to CERN. **Deadline:**

1.8.2015 -> 31.10.2015

ASTeC

Prepare a summary description of what the deliverables would be under 3D Nb/Cu Coating System. **Deadline:**

3.7.2015 -> Received in Whistler

Example: surface treatments

Chemical polishing (SUBU)

Use of existing LHC SUBU installation.

Define and fabricate specific tooling for handling at different processing phases.

Pickling + Passivation auxiliary tanks.

Define and fabricate top and bottom cavity interfaces for SUBU.

Define and fabricate tools for bath circulation inside the cavity (avoid pinholes and get homogeneous etching).

COMSOL simulations (bath speed homogeneity and tools geometry).

Foreseen budget 50 kCHF.

Electropolishing

COMSOL simulation to define cathode geometry and working parameters.

Define and fabricate electropolishing installation for both horizontal or vertical electropolishing.

Fabricate cathode in accordance with simulations.

Find space in the present premises to install the set-up.

Foreseen budget for the EP installation 200 kCHF.


18 months to have the surface treatments equipment ready: a bit tight but we will do our best.

Signatures

KE2722/BE/FCC

Signed on behalf of INFN by:

Fernando Ferroni
President of INFN

Signature 

Date **28 MAG. 2015**

Signed on behalf of STFC by:

Gillian Carr
Commercial Manager

Signature

Date

Peter McIntosh,
ASTeC Technical Director
Scientific Responsible

Signature

Date

Retrieved on 5.10.2015 the lost document signed by INFN's president, which is now being sent to STFC for signature

