MC RF WG WP structure summary

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SRF WP1: Baseline design of the RF system for acceleration to high energy: Design study

	1	2	3	4	5	input	output	EOI
1. Baseline design of the RF systems for **RCSs** including acceleration, longitudinal beam dynamics and stability, bunch length and energy spread control. a. Provide specifications for **cavity design**: **frequency**, R/Q, HOM suppression. b. Provide specification for **RF power sources**: frequency, power, …						HEC, MG, BD	PPC	CERN SY-RF Staff 0.2FTEx3y Fell 1FTEx3y
2. Calculation of **cavity parameters** for fundamental mode parameters: R/Q, Vmax; as well as for HOMs and wakes for the design work in 1.								Uni. of Rostock
3. RF design of the cavities for the RCSs as input to BDR								Uni. of Rostock
4. Design of the **RF cavities for LA and RLAs** based on the specifications from HEC and BD						HEC, BD		Uni. of Rostock

0.2FTEx3y staff
1FTEx3y pd/st
?

SRF WP2: High gradient SRF technology for muon accelerators. Synergy + potential prototypes

	1	2	3	4	5	input	output
1. Provide **limiting values for** RF cavity and RF system **design** from SRF State of the Art: - Gradient and Q0 at different frequencies: 325, 650, 1300 MHz - Tolerances to external (stray) magnetic fields - Tolerances to radiation and beam loss							HEC
2. High gradient prototype of lowest frequency (~300 - 400 MHz) accelerating structure to target high gradient: **>20 MV/m**							
3. RF power sources: High efficiency baseline design based on the parameter specification from WP1 to provide information on the power and cost							PPC
4. Synergy: Look for synergy in SRF technology with already ongoing projects and R&D activities. Direct them to the parameter space relevant for muon collider - High gradient at low frequencies - Tolerances to magnetic field, radiation and beam loss							HEC

NRF WP1: Baseline design of the RF system for Muon cooling complex. Design study

	1	2	3	4	5	input	output
1. Collect specifications for the design of **all** RF cavities for the muon cooling complex: frequency, gradient, length, B-field, aperture (window size and thickness), …						MC	
2. Based on available knowledge both experimental and theoretical, identify best concept for achievable accelerating gradient in magnetic field: material, pulse shape, temperature, gas, …							
3. Calculate parameters of all cavities specified in 1. Provide a consistent set of parameters of **all** RF cavities and associated RF systems							PPC
4. Integration of RF cavities into cooling cell, adapting design if necessary						MC,MG ,CR, …	MC
5. Mitigation of collective effects including beam loading by design of RF cavities and RF systems						MC, BD	MC, BD

CEA, LBNL are interested

NRF WP2: Conceptual design of the RF system for Muon Cooling Test Facility (MCTF). Design study

	1	2	3	4	5	input	output
1. Collect specifications for the design of RF cavities for the MCTF: frequency, gradient, length, B-field, aperture, …						MC	
2. Design the RF cavities specified in 1 using the concept identified in WP1.2							TF
3. Design of the associated RF systems for the MCTF							TF
4. Integration of the RF cavity into the MCTF cooling cell(s) including SC solenoid, cryo, etc						MC,MG ,CR,…	TF
5. Engineering design of the cavity in its environment including cooling, thermal and mechanical stability, alignment, RF diagnostic and tuning, …							
6. Design of prototype cooling cell for validating performance of RF cavities before installation in MCTF						MC,MG ,CR,TF…	TF

CEA, LBNL is interested

NRF WP3: R&D on high gradient in strong magnetic field. Potential test stand + test cavities

	1	2	3	4	5	input	output
1. Identify infrastructure available for potential use as (or setting up) an RF test stand for testing RF cavities in strong magnetic field: - RF power source, - SC solenoid, …							
2. Design and build RF test stand based on the available infrastructure and specified requirements.							
3. Propose test program adapted to potential test setup, considering possible limitations in terms of available frequency, power, magnetic field strength and size of a SC solenoid(s) - Materials, - Temperature - Pulse length/shape - Surface preparation for FE reduction - Gas							
4. Design and build test cavities							
5. Test the test cavities							MC

CEA is interested

NRF WP4: RF power sources for muon cooling RF system. Design study + synergy

	1	2	3	4	5	input	output
1. Based on the parameters of RF cavities set target specifications for the RF power sources for Muon cooling complex						MC, RF	
2. Address potential issues including: - Large number of different frequency, - High peak power requirements - High efficiency						MC	MC
3. Baseline Design of RF power source(s) to provide information on the peak power capability, efficiency and cost							PPC