



Meeting opening: Objectives, Milestones and Deliverables

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WP9 coordinators

WP9 objectives

- Define a strategy for innovative superconducting RF (SRF) cavities coated with a superconducting film.
 - Deposition techniques: PVD and ALD
 - Superconducting films: Nb, NbN, Nb₃Sn, V₃Si (and others) and SIS
 - Optimization of flat SRF thin films production procedure
- **Optimise and industrialise the production**
 - of seamless copper cavities and
 - of the deposition techniques.
- Produce and test prototypes of SRF (single-cell elliptical) cavities:
 - Initially with pre-prototypes with $f = 6$ and 3 GHz
 - Scaling up for $f = 1.3$ GHz.
- Test a new laser treatment of Nb coated cavity.

➤ Main goal:

- Improving the performance and reducing the cost of acceleration systems
 - both production and operation

- **Task 9.1: Coordination** and strategy for innovative superconducting accelerating cavities
 - CEA, INFN, HZB, HZDR, LancU, UKRI, USI, JLab...
 - *Task Leaders: C. Antoine (CEA), O. Malyshev (UKRI)*

Coordination

IFAST WP9 Milestones		IFAST WP9 Deliverables	
<p>MS37 International thin film workshop organization (web site + Report) Report by Claire, Cristian and Oliver? delay (Oct 2024) M42</p>	M28	<p>D9.1: Thin-Film SRF roadmap report. <i>Summaries of the results obtained within the workpackage and prospective inspired from WP advances as well as discussions at TF-SRF 2022.</i> Report by Claire and Oleg with contribution from all partners by Jan. 2024</p>	<p>M35 M45 Jan 25</p>
<p>MS38 First seamless copper 1.3 GHz cavity produced as substrate for the coating of the SC film (Report - done)</p>	M12	<p>D9.2: RF test on coated resonant cavity. <i>Resonant cavity coated and tested with an alternative material to Niobium with a $Q_0 > 10^9$ at 4.2 K and 1.3 GHz.</i></p>	<p>M46 M48</p>
<p>M39 Coating facility built and tested at STFC, USI and INFN (Report - done)</p>	M12	<p>D9.3: First 6 GHz cavity coated and characterised. <i>Results from the morphological and SC characterisation of first coated cavity with an alternative material to Niobium.</i> AS for delay Report by Cristian and Reza by end of Dec. 2024</p>	<p>M36 M46</p>
<p>MS40 Construction and operation of the cavity dedicated ALD system (Report - done)</p>	M24	<p>D9.4: Deposition of superconducting multilayers on cavities. <i>1.3 and 3 GHz Nb and Cu cavities coated and tested with multilayers.</i></p>	M46
<p>MS41 A facility for laser operation for complex 3D treatment is tested on 1.3 GHz cavity (Report) Report by Artur, Cristian and Reza by mid-March 2024</p>	M36	<p>D9.5: 1.3 GHz Nb-coated cavity irradiated by laser in Ar atmosphere and RF tested. <i>Increasing of the field of magnetic flux entry in Nb coated 1.3 GHz cavity irradiated by laser in argon atmosphere. Standard RF testing.</i></p>	M45
<p>MS42 ARIES samples prepared for renewed SC film deposition (Report)</p>	M6	<p>D9.6: Test of thin-film samples. <i>Four thin film samples reprocessed by 4 different techniques and tested with QPR.</i></p>	M46

- **Task 9.1: Coordination and Strategy for innovative superconducting accelerating cavities**
 - CEA, INFN, HZB, HZDR, LancU, UKRI, USI, JLab...
 - *Task Leaders: C. Antoine (CEA), O. Malyshev (UKRI)*
- This tool is now used for participation in **Accelerator R&D Panel for implementation of the Accelerator R&D Roadmap of the European Strategy for Particle Physics (ESPP)**
 - The Large Particle Physics Laboratory Directors Group (LDG) was mandated by the CERN Council in 2020 to develop an Accelerator Research and Development roadmap.
 - This Roadmap (Annex 1, <https://cds.cern.ch/record/2800190?ln=it>) was presented to the Council at its meeting in December 2021 and the Council invited LDG to elaborate a detailed implementation plan.
 - C. Antoine and O. Malyshev are co-chairs in WP2: SC TF cavities

Some updates from Accelerator R&D Panel

To study:

- How big or small is the thin film SRF community in Europe,
- What are we going,
- What is an annual budget,
- How well we are integrated,
- Is there any duplication,
- If we have a larger budget would it give a greater impact on deliverables.

- In June 2023, we invited 1 or 2 leaders from each partner in Europe (including CERN and DESY) to fill an EXCELL table
- The results were analysed and reported to Giovanni Bisoffi (INFN) and Peter McIntosh (STFC), the coordinators of LDG RF Implementation Panel
- They reported a summary of this at [Community Report on Accelerators Roadmap](#) on 12–13 Jul 2023 at INFN-FNL
- CERN Council Report (“short” report) - Nov 2023 includes these results.
- More work is expected in spring-summer 2024

NEXT WP11 meeting

- In-Person meeting
 - In Daresbury Laboratory
 - on 18-19 January 2024
 - Starting at 14:00 CET on 18th Jan
 - Finishing not later than 16:00 on 19th Jan
 - Hybrid (in person and zoom)

2024 IFAST Annual Meeting

- In-Person meeting
 - on 15 to 19 April 2024
 - Near Paris
 - 12th WP9 meeting is on 16th April
 - from 9:00 to 18:00
 - **in-person** (preferable) and zoom

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