SRF2025 TOKYO

22ND INTERNATIONAL CONFERENCE ON RF SUPERCONDUCTIVITY

September 21-26, 2025

Contribution ID: **226** Contribution code: **MOP18** Type: **Poster Presentation**

Nb3Sn coatings on copper at INFN-LNL

Monday 22 September 2025 14:30 (3 hours)

The successful development of Nb3Sn/Cu coatings for the SRF cavities of next generation particle accelerators would allow for the operation of the SRF system at 4.5 K, resulting in a reduction of the needed cryogenic power by a factor 3 with respect to what normally needed for bulk Nb cavities, operated at 2 K. In the framework of I.FAST and ISAS collaborations, an optimized recipe for Nb3Sn films deposited via DCMS has been established on small samples at INFN-LNL and is discussed in this work. Films with a Tc ≥ 17 K at deposition temperatures ≤ 650 ℃ on Cu substrate pre-coated with a 30-micron thick buffer layer of Nb have been successfully produced. The same deposition recipe is RF validated on bulk Nb QPR sample, with the results being also discussed in this work. A surface resistance of 23 nΩ at 4.5 K (at 20 mT, 417 MHz, with quench field ˜ 70 mT) is measured, which is about 5 times larger than the baseline specifications for the LHC Nb/Cu cavities and already fulfills the requirements for the FCC-ee. Finally, the expected challenges toward the scalability of the coating recipe to an elliptical cavity prototype are discussed.

I have read and accept the Privacy Policy Statement

Yes

Footnotes

Funding Agency

Author: FONNESU, Dorothea (Istituto Nazionale di Fisica Nucleare)

Co-authors: BATTISTELLO, Alex (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); PIRA, Cristian (Istituto Nazionale di Fisica Nucleare); FORD, Davide (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); CHYHYRYNETS, Eduard (Istituto Nazionale di Fisica Nucleare); STIVANELLO, Fabrizio (Istituto Nazionale di Fisica Nucleare); PASQUATO, Flavio (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); KEPPEL, Giorgio (Istituto Nazionale di Fisica Nucleare); Dr LAZZARI, Matteo (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); LOLLO, Michele (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); AZZOLINI, Oscar (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro); BORTOLAMI, Thomas (Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Legnaro)

Presenter: FONNESU, Dorothea (Istituto Nazionale di Fisica Nucleare)

Session Classification: Monday Poster Session

Track Classification: MC2: Fundamental SRF research and development