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R&D in superconducting RF: thin film capabilities as a game changer for future sustainability

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Superconducting RF thin film (SRF-TF) technology for RF cavities has only recently began to achieve accelerator field gradients and Q-factors close to that of bulk niobium SRF cavities. These thin films (such as Nb₃Sn, NbTiN, Mg₂B and multilayer structures) offer the ability to operate at higher temperatures (4.2 K instead of 1.9 K) thereby increasing the operating efficiency of the RF system and also the potential for achieving higher operating gradients (>50 MV/m) thereby reducing the practical accelerator footprint, both of which aiming to help maximise future sustainability. Much more development however is needed to optimise and master the thin film deposition process on RF cavities, as well as to understand the fundamental RF performance of these enhanced films. In order to develop SRF-TF capabilities beyond current limits, there are a number of international collaborations ongoing which will be described, in Europe it is being conducted under the umbrella of the H2020 ARIES and IFAST programmes.

Funding Agency

Footnotes

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Yes

Primary author: ANTOINE, Claire (Commissariat à l'Energie Atomique)

Presenter: ANTOINE, Claire (Commissariat à l'Energie Atomique)

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