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Development of a Station at the CERN Central Cryogenic Laboratory for the Measurement of the Critical Temperature of Superconducting Thin Films Deposited on Copper

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The FCC Study is an international collaboration established, in the search for physics beyond the Standard Model, to investigate the feasibility of a new circular collider having LHC as main injector. To this end, the development of ad-hoc SRF cavities represents a major challenge, for which superconducting (SC) film coated copper cavities are one of the pursuable solutions. Among the several options, A15 compounds are being explored as coating materials, in particular Nb₃Sn and V₃Si. To assess the quality of the SC films on their substrate and to investigate how the condition of the substrate can cause deviation of their behaviour from what is observed in bulk materials, it is important to study their physical and thermal properties such as the critical temperature T_c . For A15 in particular, the achievement of the literature values of T_c still represents a non-trivial goal. In this work, we present the development of a dedicated test stand commissioned at the CERN Central Cryogenic Laboratory for the contactless, inductive measurement of the T_c of SC thin-film samples deposited on copper, and discuss the results from the first measurements performed with it.

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