

Part-time **Ph.D.** position available within the project “*High temperature superconducting RF coil fabrication on flexible ceramic substrates for magnetic resonance imaging applications*” - PN-III-P1-1.1-TE-2019-1777-191/13.01.2021-Supraflex, under development at the **Technical University of Cluj-Napoca**, Cluj-Napoca, Romania. The object of the project is to develop a high temperature superconducting (HTS) thin film deposition technology on flexible ceramic wafers. This technology will be then used for the development of radio-frequency coils used in magnetic resonance imaging applications. The use of high temperature superconducting films leads to an increased signal-to-noise ratio of the coil, due to the low surface resistance of such materials. Additionally, the flexibility of the surface coils would extend the field-of-view of the investigated sample, while also allowing a phased coil array configuration of multiple superconducting coils. This again will benefit the larger field-of-view and increased penetration of the investigated sample. The superconducting coil fabrication will be performed using state-of -the-art processes used in field of HTS thin film growth. A solution deposition planarization layer will be deposited on the ceramic substrate in order to prepare a low roughness template for further growth. Next, a bi-axially textured buffer layer architecture will be deposited. This will ensure an epitaxial growth of the superconducting YBa₂Cu₃O₇ (YBCO) which will be deposited by pulsed laser deposition. The epitaxial structure of the YBCO is needed for optimal DC and RF properties. Finally, after a ultra-violet lithography step, the as obtained superconducting RF coil will be characterized and its performance evaluated (Q-factor and S parameters).

Job description: Deposition of buffer MgO epitaxial thin films using the ion beam assisted deposition (IBAD) technique, Design and optimization of UV lithography masks for RF coil fabrication, UV lithography and related processes for RF coil fabrication.

Requirements: The candidate should have a Master’s degree in Electrical or Materials Engineering and must be enrolled in a doctoral study program (Ph.D. student).

Application interval: 25.07.2022 – 08.08.2022

Further information:

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