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Depth-resolved characterization of the magnetic field screening in superconducting RF materials near the critical field

Thursday 25 September 2025 14:30 (3 hours)

The new "β-SRF" facility at TRIUMF allows for the near surface characterizations of materials with β-radiation-detected nuclear magnetic resonance (β-NMR) in applied magnetic fields up to 200 mT parallel to the sample surface. The unique facility can probe the local magnetic field within the first 100 nm of the surface and allows , for example, to measure the evolution of the Meissner screening profile as a function of applied parallel field right up to the critical field of niobium. It is the only place in the world where such a direct measurement of the local magnetic field is possible near the critical field and is ideal for the characterization of new doping treatments or layered systems. First measurements on two Nb samples one with a standard baseline treatment and with an O-doped treatment have been measured. The samples show contrasting evolution in their magnetic field screening as the applied field is increased up to 200 mT. The method and results will be summarized and the interpretation discussed utilizing recent theories.

I have read and accept the Privacy Policy Statement

Yes

Footnotes

Thoeng, E., Asaduzzaman, M., Kolb, P. et al. Depth-resolved characterization of Meissner screening breakdown in surface treated niobium. Sci Rep 14, 21487 (2024). https://doi.org/10.1038/s41598-024-71724-5

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