HZB Helmholtz Zentrum Berlin

QPR measurement results Nb_3Sn sample (preliminary)

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Run #40

General remarks

- **Measurements were taken at the first QPR mode (416 MHz)**

  → more time to study cooldown cycles

- **5 datasets for R_S**
  - Initial cooldown (standard procedure)
  - Cycle of sample only, T_{max} = 20 K, heater controlled slow cooldown with $\Delta T/ \Delta t$ = -0.1 K/min (lowest possible ramp setting)
    → radial temperature gradient across the sample due to the heater location at the center of the sample
  - Cycle of sample only, T_{max} = 20 K, fast cooldown by switching off the sample heater
    → low radial temperature gradient across the sample

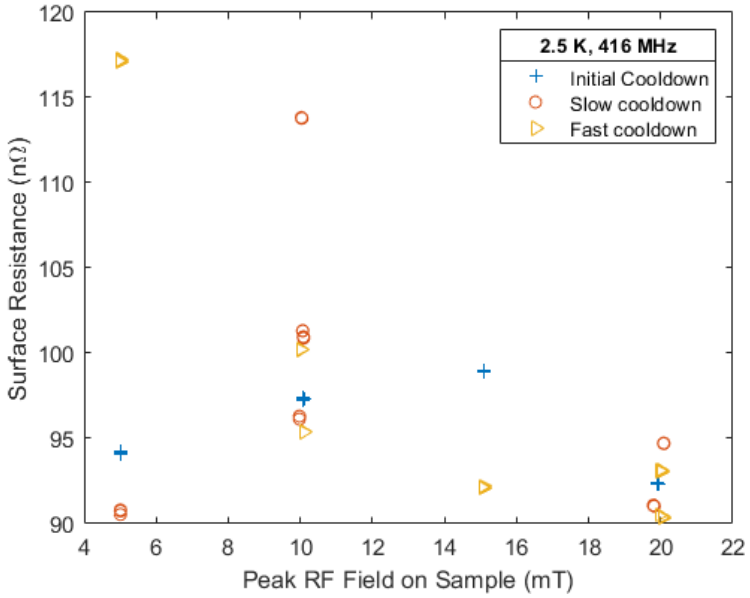
- **Frequency shift measurement (to extract T_C and penetration depth) not fully analyzed, yet.**

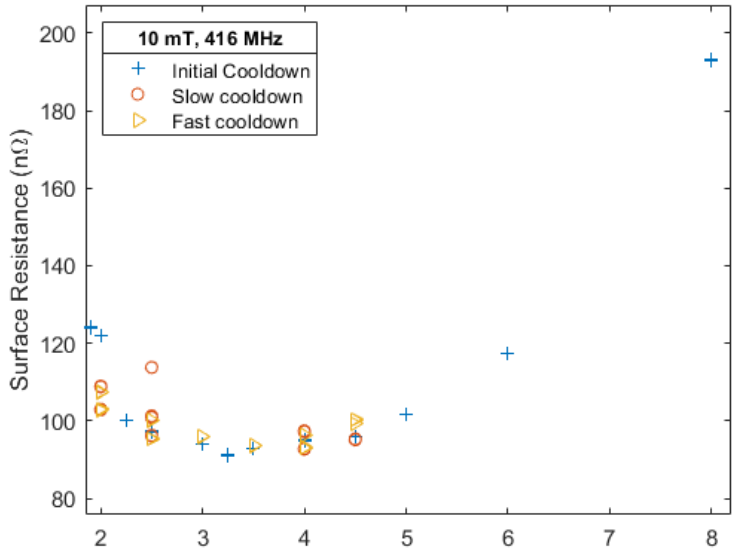
  → T_C can be seen, other statements need further analysis and compensation of instrument effects

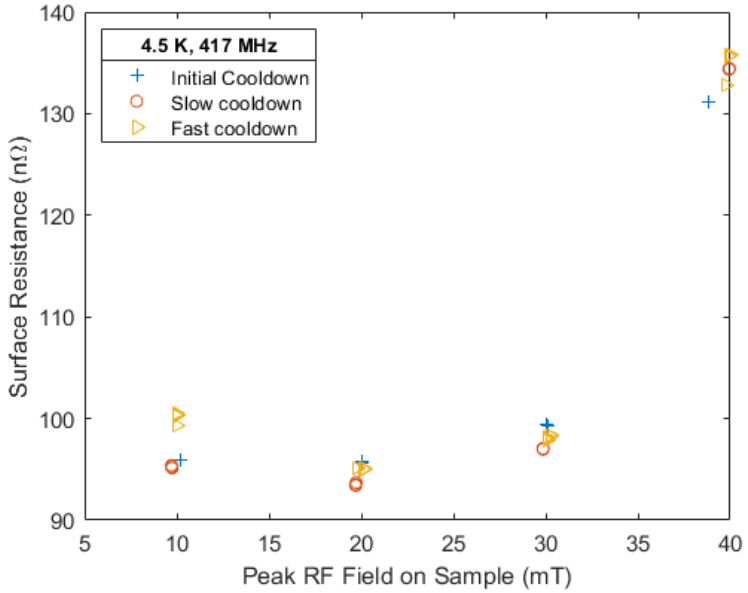
- **Critical field measurement at 416 MHz**
  - T_C in agreement with frequency shift measurement

Surface resistance RS vs T

- Residual resistance higher the policted 20 nΩ at 417 MHz
- Significant Q-slope (increase of R_S with RF field)
- Plots show measurement raw data, some points still need to be excluded due to instrument effects
- Please start eating – I will be there soon!

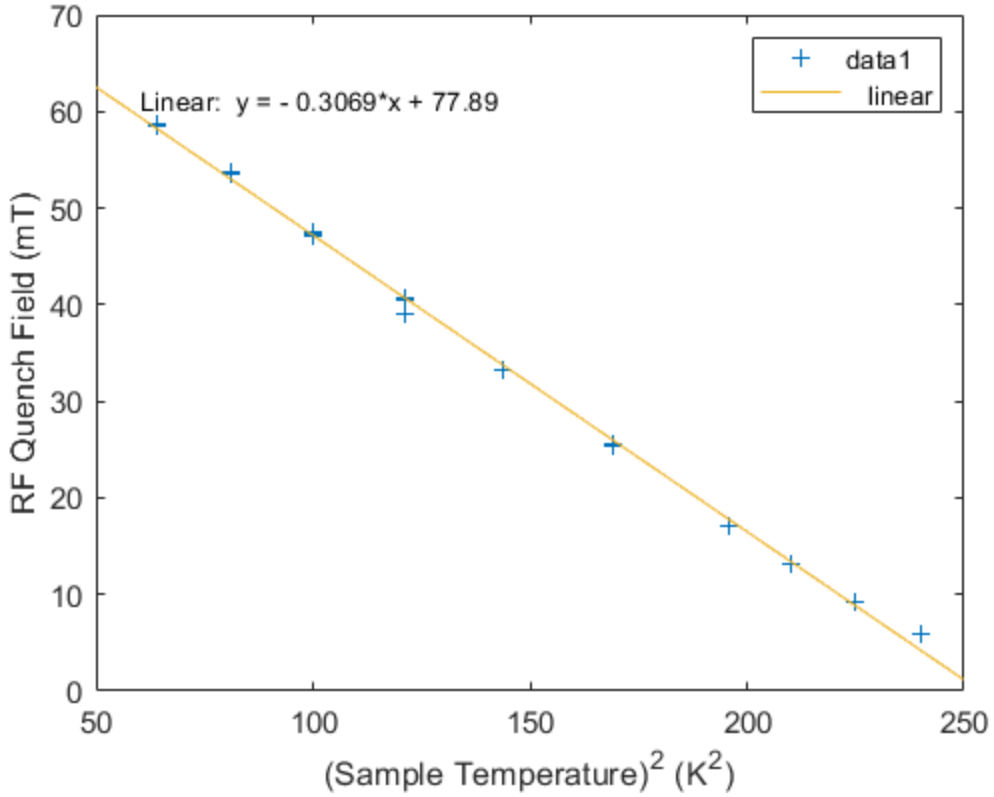


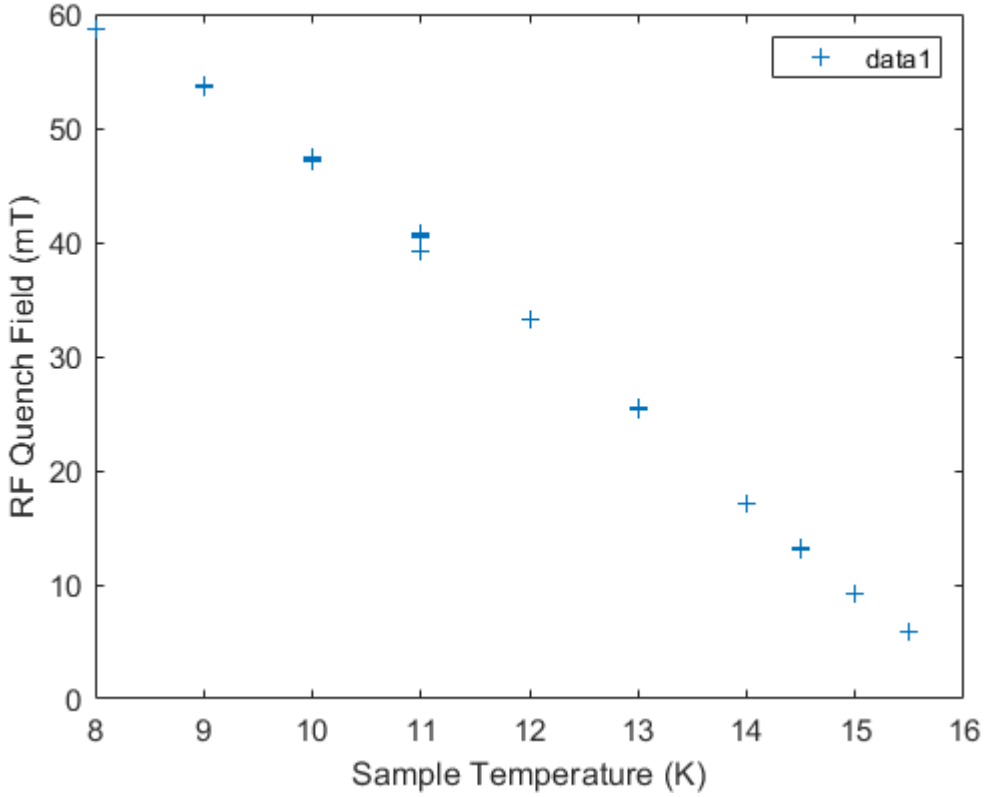




RF quench field

- $T_C \approx 16$ K
- B_C (0 K) = 78 mT





Frequency shift measurement

- **$T_C \approx 16.4$ K**
- **Plot shows measurement raw data !**
  - fitting for penetration depth needs more analysis and compensation of instrument effects (e.g. linear drifts with opposite signs in both curves and step in blue curve)
  - „standard“ fits do not converge → possible explanations: coating too thin or vertically inhomogeneous film (higher sample temperatures probe thicker layer of sample adapter