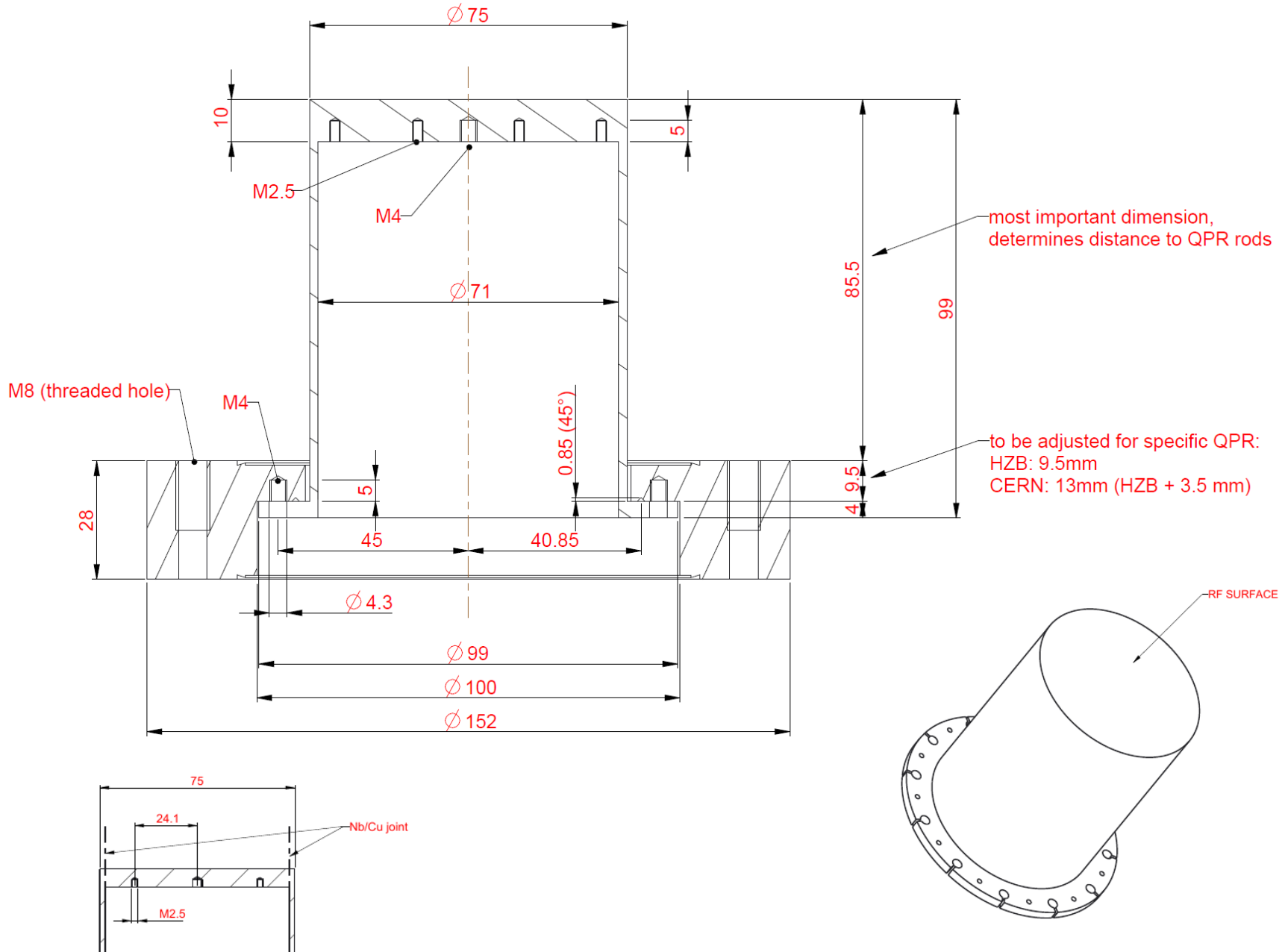


Status of RF characterisation facilities: The HZB quadrupole resonator

Oliver Kugeler
6th WP15 ARIES meeting
31.08.2018

SAMPLES TO BE MANUFACTURED AT RI



Test welds Nb to Cu before etching, welding performed at RI



25 : 1

1 mm



100 : 1

200 μm



50 : 1

500 μm



100 : 1

200 μm

courtesy Research Instruments

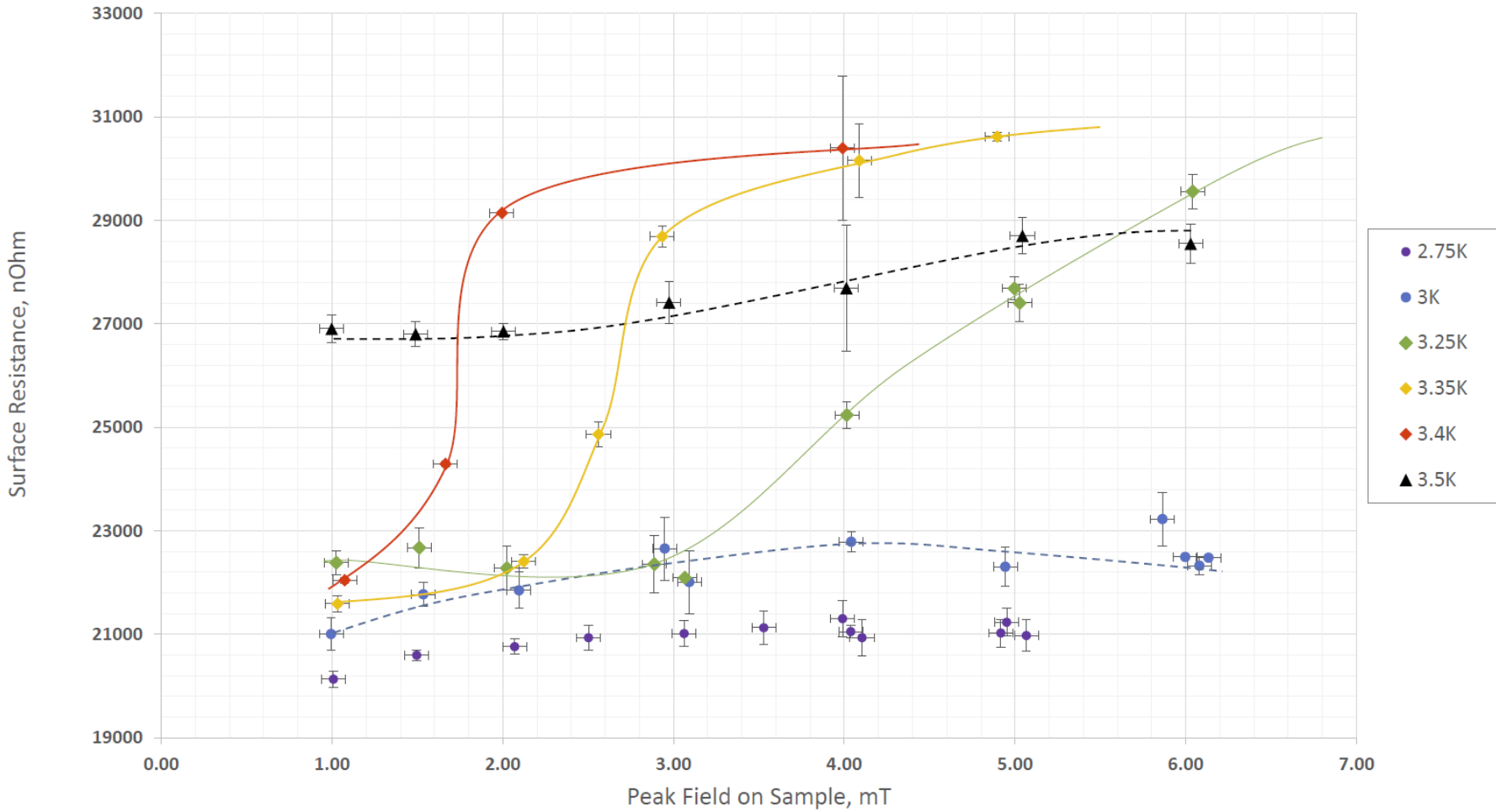
Test welds – Nb to Cu after etching



Delays in the procurement process, but:

- **Cu has been delivered**
- **Nb will be delivered by mid September**
- **manufacture of Cu pieces has already started**
- **Dmitry Tikhonov will accompany vital production steps**
- **finalization of samples will be delayed**
- **one RF test in 2018 still doable**

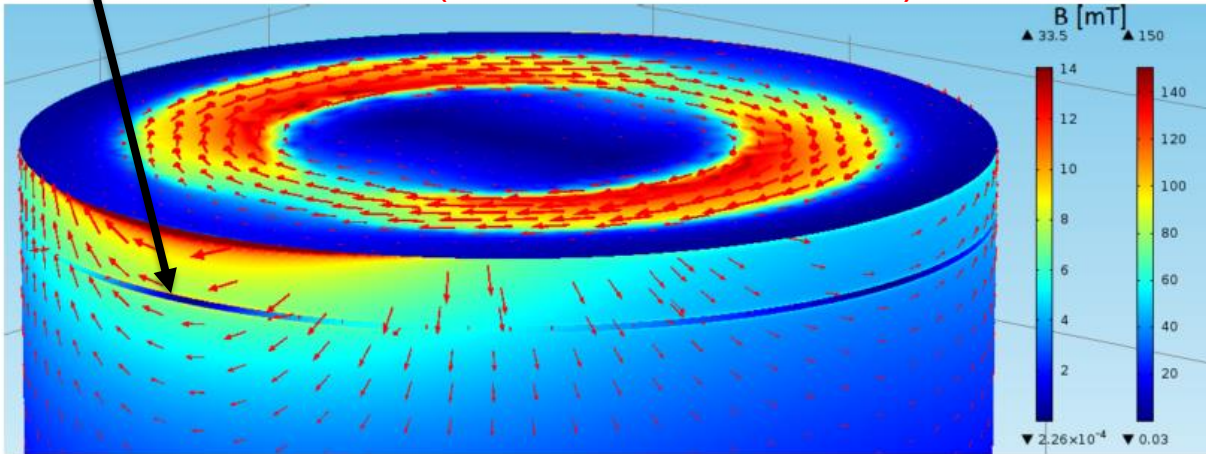
Surface Resistance vs Peak Field on Sample for different temperatures at 847 MHz



courtesy Dmitry Tikhonov

interface-gap

(red arrows = currents)



courtesy Sebastian Keckert



- Currents are driven perpendicular to the gap
- Currents can enter the interface-gap (even if the RF cannot propagate)
- Imperfect joint between sample and cylinder allows for a part of the current to cross the interface-gap, another part to reach the indium
- Crossing currents experience voltage drop at NC oxide interface
- Surface roughness of sample and cylinder at interface limits contact area, critical current density of Nb can be exceeded which causes local contained quenches and voltage drop (and Ohmic heating)
- Voltage drop causes Ohmic heating which biases the calorimetric measurement (even dominates it)

