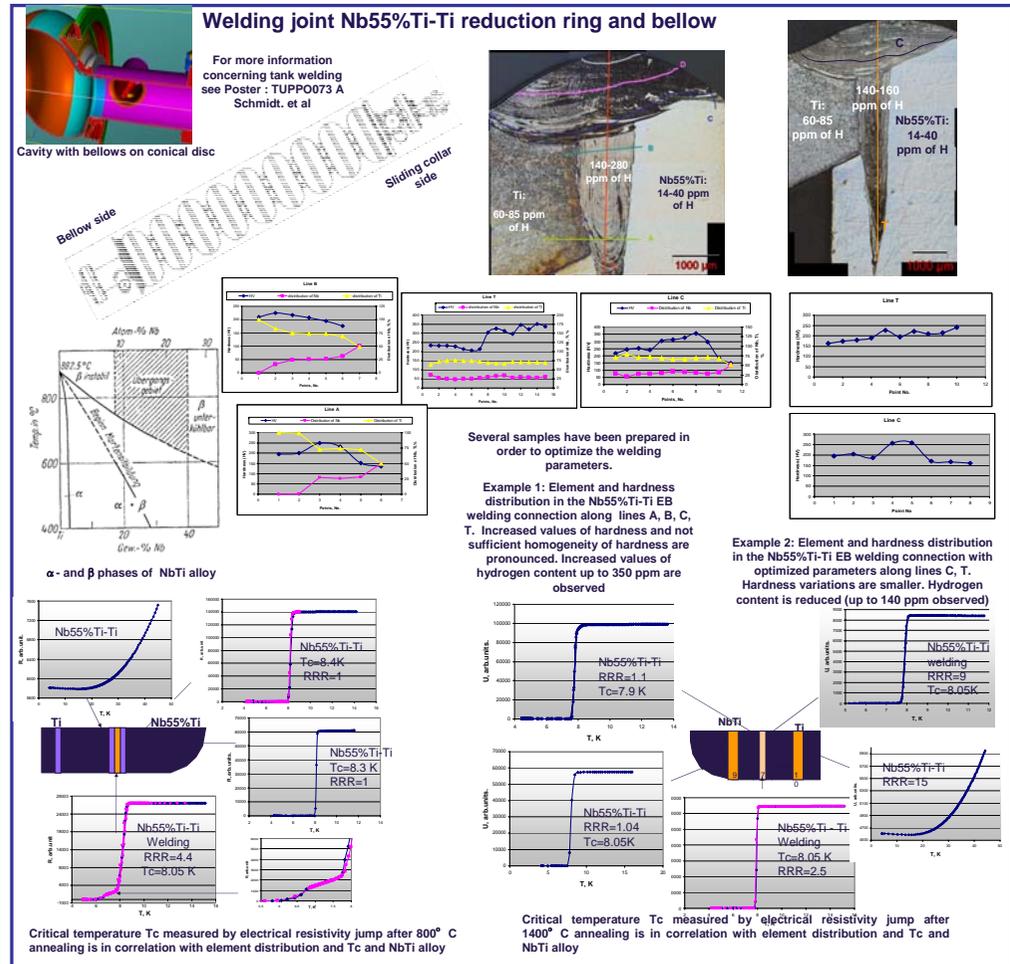
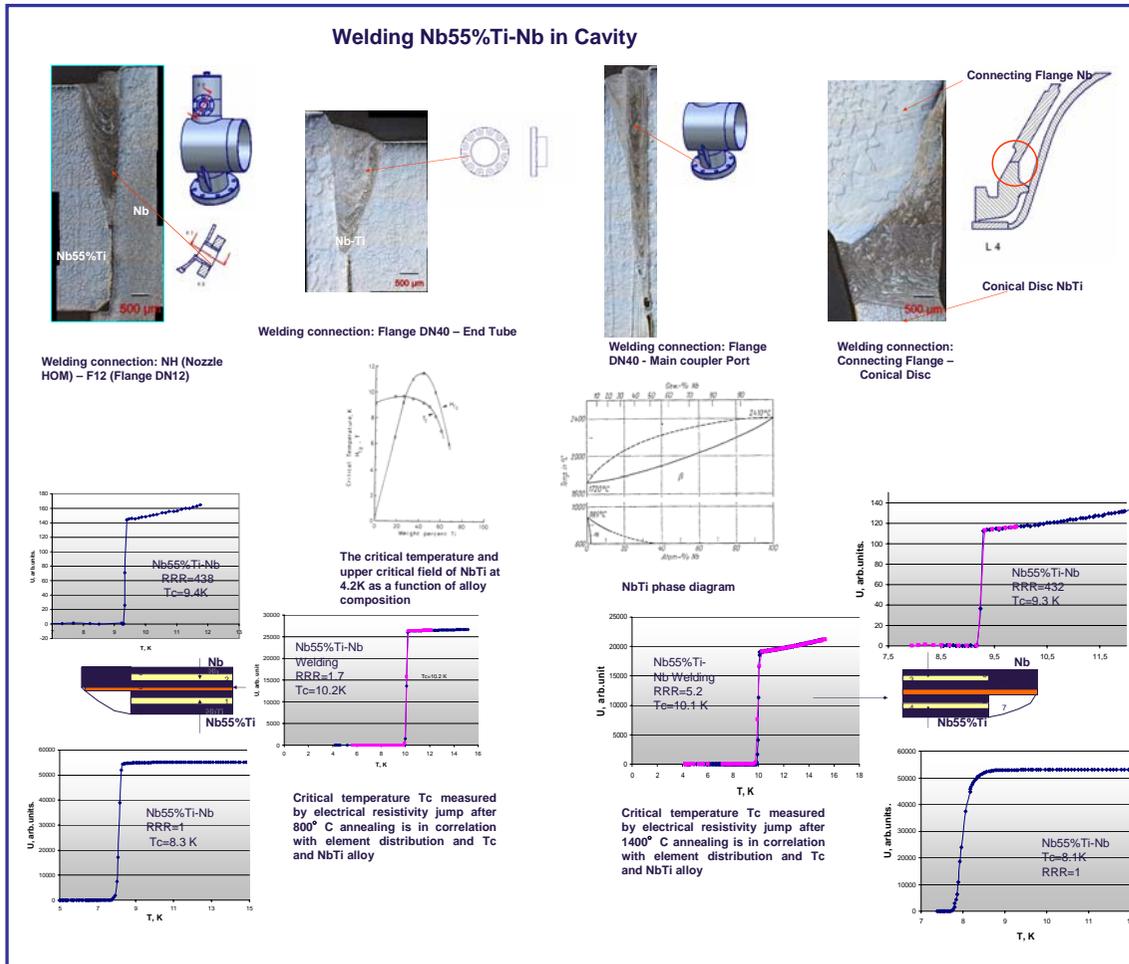


## Abstract

The welding parameters of Nb55%Ti-Ti and Nb55%Ti-Nb connection of cavities for XFEL are investigated. These are the welding connections of conical disc with helium tank rings (ring with bellow and reduction ring) and of conical disc with connecting flange. Several samples of welding connections have been prepared using the electron beam welding machine of DESY. Some samples are extracted from a real cavity. The metallographic structure, EDX element analysis, measurement of gas content, Vickers hardness HV, RRR and electrical resistivity measurement have been done.



## Summary:

Properties of the welding connection Nb55%Ti-Nb demonstrate the presence of the stable bcc body-centered cubic  $\beta$ -phase according to the phase diagram of NbTi alloy. The HV changes rather uniformly, annealing at 1400° C with slow cool down of the sample as well as quick cool down of the sample in the liquid nitrogen does not lead to changes of the behavior. The small maximum of the critical superconducting temperature  $T_c$  in agreement with the element distribution in the welding connection is observed.

Properties of the welding connection Nb55%Ti-Ti demonstrate the presence of the mixture of the bcc  $\beta$ -phase and the hexagonal  $\alpha$ -phase. Maximum of the HV and increased hydrogen content in the welding connection was observed.