Status Report

100 keV DC Gun Test Stand

September 2, 2005
Gun Test Stand Status

• Since the last meeting
  • Zoom optics resolution determined
    → SLS internal note to be published soon → http://slsbd.psi.ch/pub/
  • Installation of hardware completed
    • $10^{-6}$ mbar leak at the weld seam of a bellow from VAb GmbH
      → weld seam redone in house
    • $10^{-8}$ mbar leak in the insulator of the SMA feedthrough after bake-out
      → attempt to weld in another SMA feedthrough failed
      → SMA feedthrough sealed with silicon, withstood second bake-out
      → new cathode cone design with removable CF16/CF40 feedthroughs

• Ongoing
  • ZrC single tip: thermionic emission
  • ZrC single tip: anode electron bombardment
  • HV testing
  • Diagnostics testing
  • Installation of first FEA with proper cathode electrode
  • Installation of new cathode cone
Installation Completed
Gun Test Stand Status

• Since the last meeting
  • Zoom optics resolution determined
    → SLS internal note to be published soon → http://slsbd.psi.ch/pub/
  • Installation of hardware completed
  • $10^{-6}$ mbar leak at the weld seam of a bellow from VAb GmbH
    → weld seam redone in house
  • $10^{-8}$ mbar leak in the insulator of the SMA feedthrough after bake-out
    → attempt to weld in another SMA feedthrough failed
    → SMA feedthrough sealed with silicon, withstood second bake-out
    → new cathode cone design with removable CF16/CF40 feedthroughs

• Ongoing
  • ZrC single tip: thermionic emission
  • ZrC single tip: anode electron bombardment
  • HV testing
  • Diagnostics testing
  • Installation of first FEA with proper cathode electrode
  • Installation of new cathode cone
Current Cathode Cone Design

- Cathode mount
- Custom welded feedthroughs
- Cone
- CF200 flange
New vs. Old Cathode Cone Design

- Custom welded feedthroughs
- CF100 flange for mounting standard CF16/40 feedthroughs

Custom welded feedthroughs
Gun Test Stand Status

• Since the last meeting
  • Zoom optics resolution determined
    → SLS internal note to be published soon → http://slsbd.psi.ch/pub/
  • Installation of hardware completed
  • $10^{-6}$ mbar leak at the weld seam of a bellow from VAb GmbH
    → weld seam redone in house
  • $10^{-8}$ mbar leak in the insulator of the SMA feedthrough after bake-out
    → attempt to weld in another SMA feedthrough failed
    → SMA feedthrough sealed with silicon, withstood second bake-out
    → new cathode cone design with removable CF16/CF40 feedthroughs

• Ongoing
  • ZrC single tip: thermionic emission
  • ZrC single tip: anode electron bombardment
  • HV testing
  • Diagnostics testing
  • Installation of first FEA with proper cathode electrode
  • Installation of new cathode cone
Thermionic Emission from ZrC Single Tip

![Graph showing thermionic emission from ZrC single tip with currents labeled as I_\text{emit} and I_\text{heat} for cathode voltages U_\text{cath} = -700V and U_\text{cath} = -1000V.](image)
Gun Test Stand Status

• Since the last meeting
  • Zoom optics resolution determined
    → SLS internal note to be published soon → http://slsbd.psi.ch/pub/
  • Installation of hardware completed
  • $10^{-6}$ mbar leak at the weld seam of a bellow from VAb GmbH
    → weld seam redone in house
  • $10^{-8}$ mbar leak in the insulator of the SMA feedthrough after bake-out
    → attempt to weld in another SMA feedthrough failed
    → SMA feedthrough sealed with silicon, withstood second bake-out
    → new cathode cone design with removable CF16/CF40 feedthroughs

• Ongoing
  • ZrC single tip: thermionic emission
  • ZrC single tip: anode electron bombardment
  • HV testing
  • Diagnostics testing
  • Installation of first FEA with proper cathode electrode
  • Installation of new cathode cone
Cathode Electrode
Anode
Solenoid with Faraday Cup, YAG Screen and Slit Array