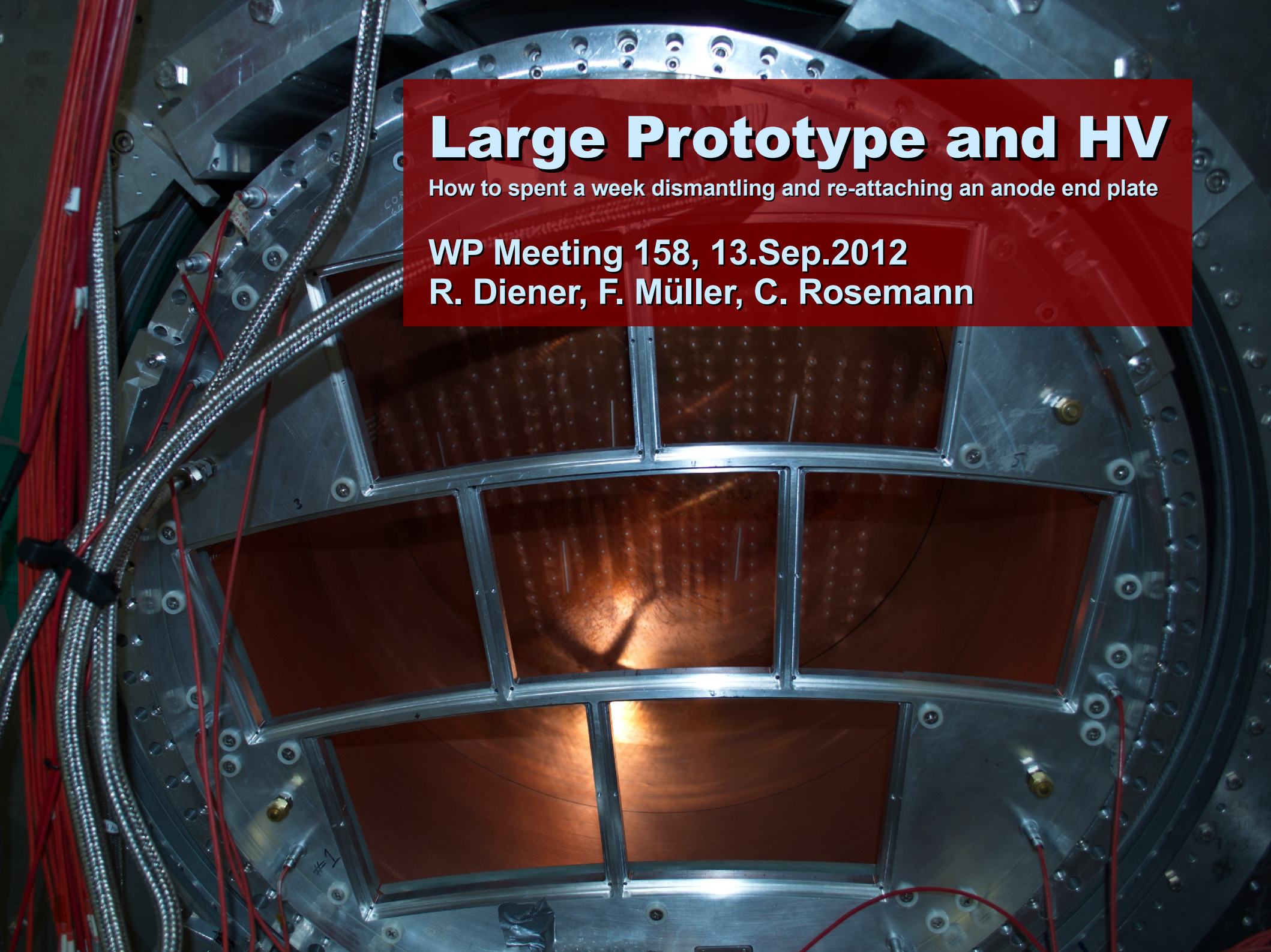


Large Prototype and HV

How to spent a week dismantling and re-attaching an anode end plate

WP Meeting 158, 13.Sep.2012

R. Diener, F. Müller, C. Rosemann

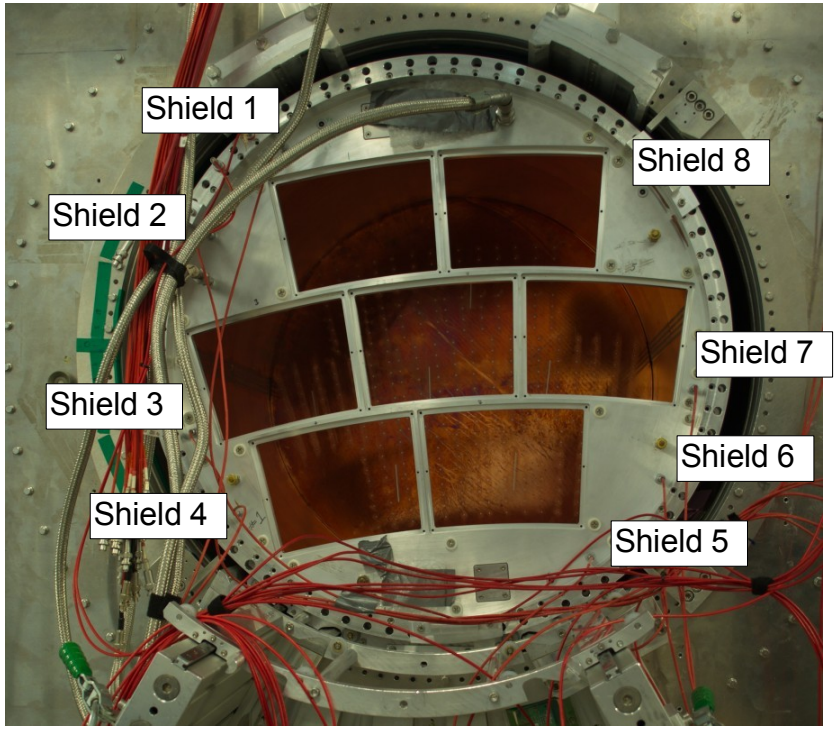
LP HV Problems

- Initial problem: HV of field cage tripped after several hours:
  - 15.0 or 15.5kV: ~11-12h
  - 16.0kV: ~several hours (3 or more)
  - 17.0kV: ~half an hour

- Investigation:
  - Connect 7th strip, all shield plates and dummy modules on single channels, to see if we can locate a source for the trips there
  - Testing started 27.Aug.2012
  - Some damaged HV cables found

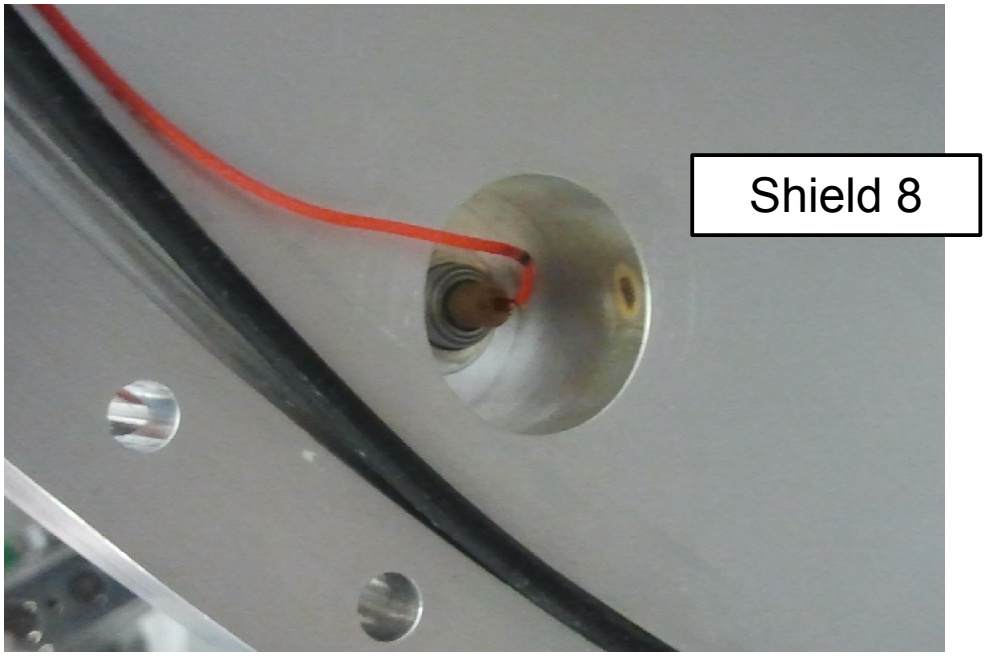
LP HV Anode Plate

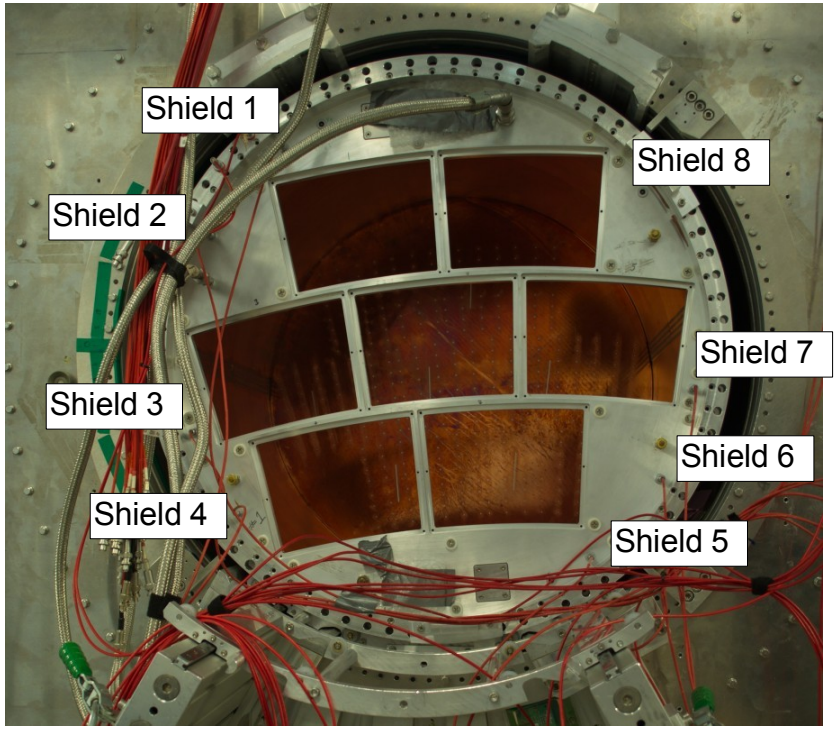
- Seen strange tripping all over the end plate when channel voltage about 2100-2200V
- Setting all to 2000 and raising one by one: shield 8 didn't stand it
- First inspection:



LP HV Anode Plate

- Monday:
  - Opening end plate





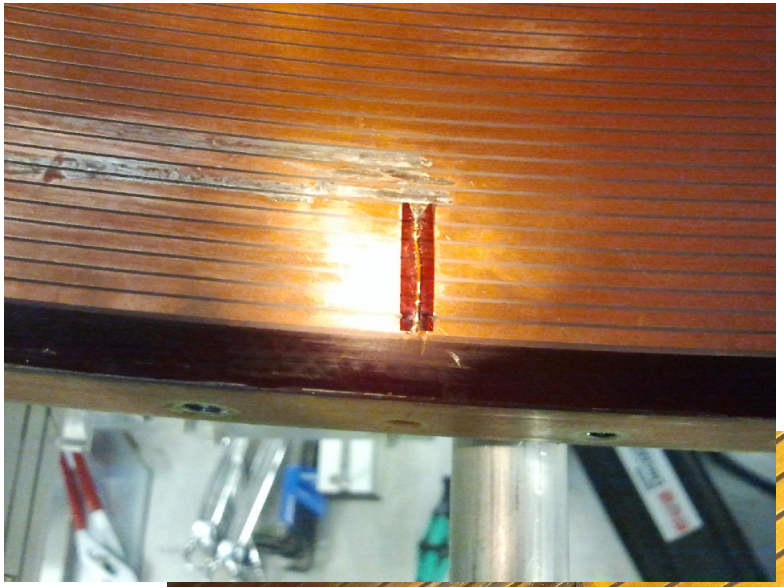
  - Fixed by cutting out damaged part and re-attaching cable

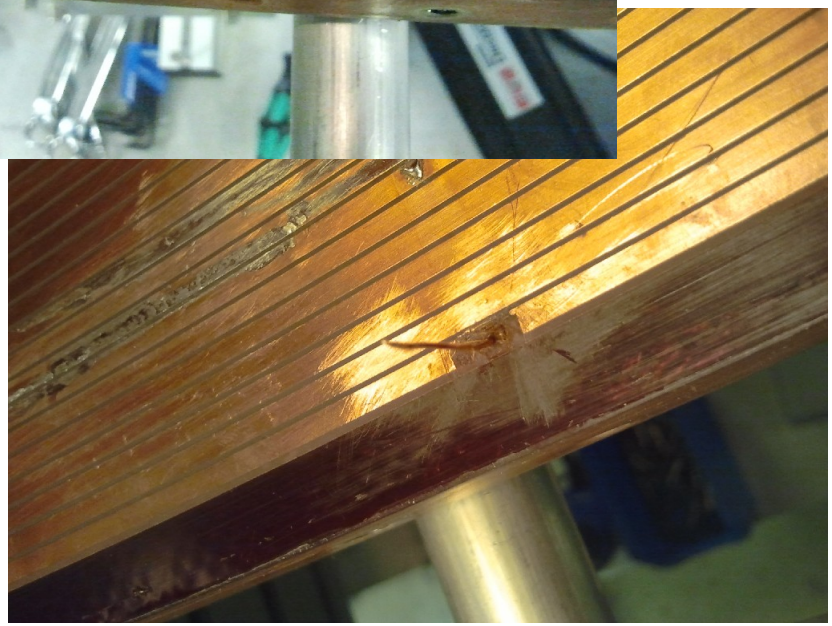
LP HV Anode Plate

- Tuesday:
  - Next test: shield 5 had connection to ground
    (clamped the cable between end plate and field cage → repaired)

- Wednesday:
  - Problems with 7th strip:
    - insulation showed scratches
    - put Kapton on top

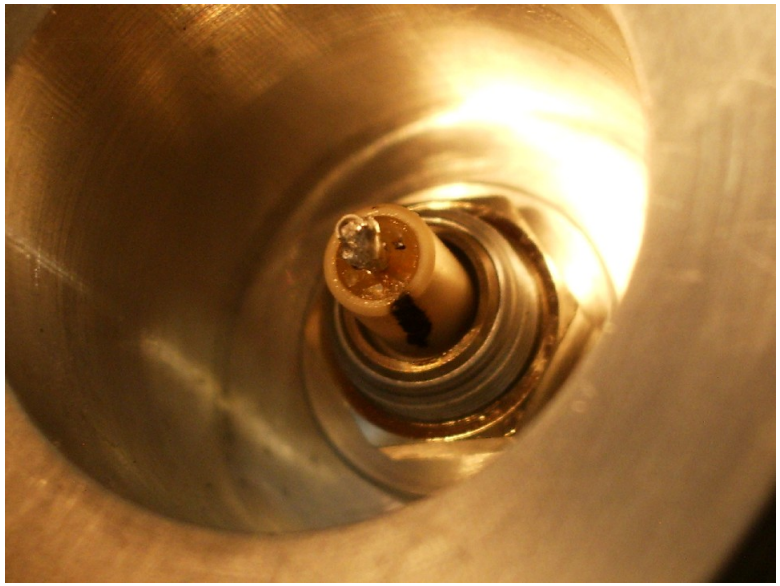
- Thursday:
  - More problems with 7th strip
  - Now complete reworking of the insulation (top and bottom):
    - bigger Kapton piece below
    - epoxy around hole in 1st strip
    - shrinking tube
    - some Kapton tape on top



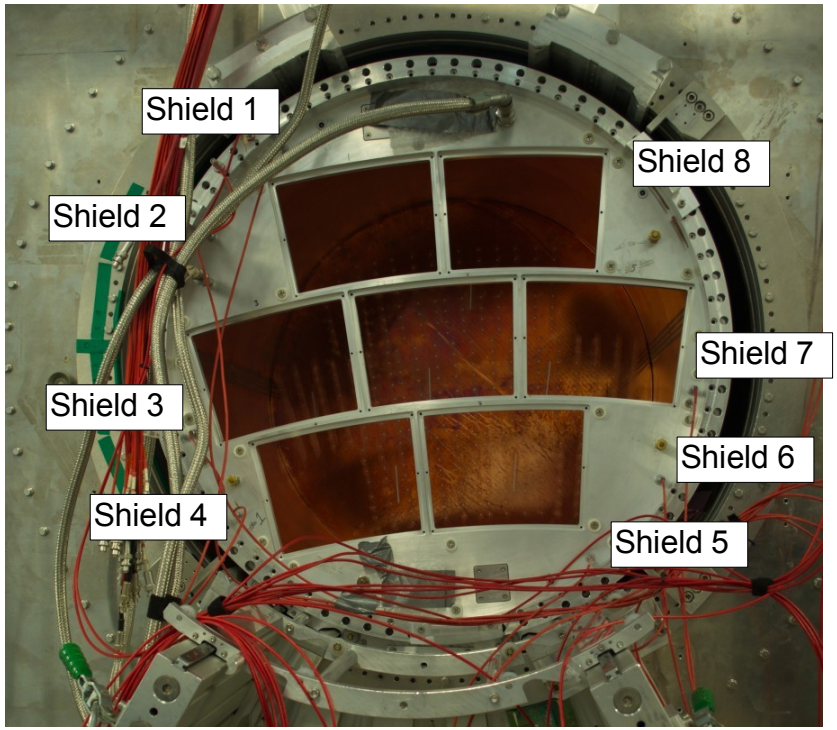


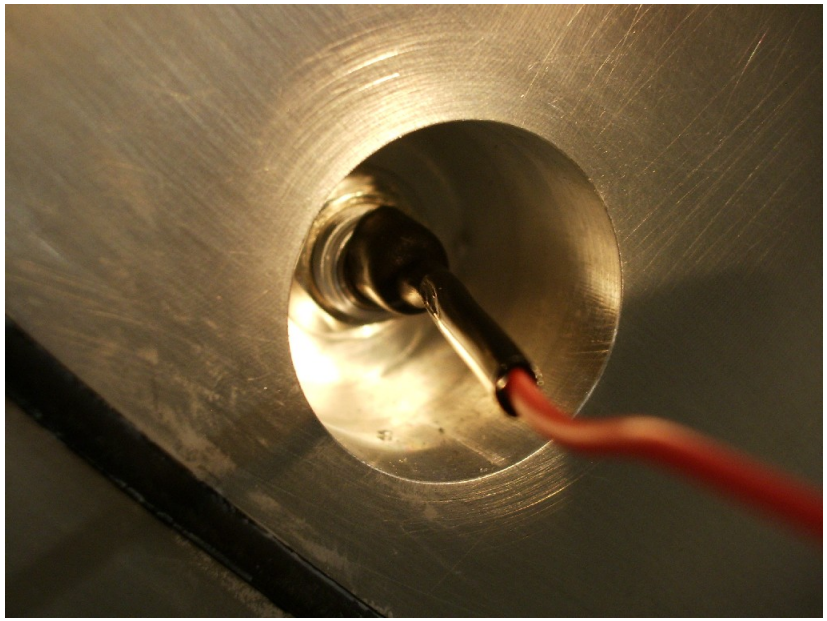
LP HV Anode Plate

- Friday:
  - 7th strip OK, but shield 4 can't go over 1200V
  - Opening LP for the 5th time
  - Carbon bridge at Fischer receptacle



  - Decision: insulate all shield connections
    - All shield parts dismantled
    - All parts cleaned with isopropanol (carbon traces etc.)
    - Shrinking tube over connectors and wires





LP HV Anode Plate

- Saturday:
  - Field cage powered up again and everything works
  - Shield set to 2250V, cathode at 16kV
- Sunday:
  - Trip after 9 hours, no currents on the shields or dummy modules
    → Modules are safe, problem at another place of the LP
  - Fault: unfortunately “trip” was not connected to “kill” on the CAEN power supply
    → tripping has lasted some time
- Monday:
  - Opening field cage to check
  - Cleaning carbon spots
  - Field cage still working
- Starting testbeam preparation

Conclusions

- For a detailed listing of actions see logbook:
  https://ttfinfo.desy.de/LP1elog/
  - entries from the weekend (8. and 9. Sept.) unfortunately listed on Friday (7.Sept.)

- Next end plate:
  - Cables to shield plates should be as short as possible (easily slip out while inserting end plate)
  - Better HV insulation (cables and end points)
- Next field cage:
  Connection to the 7th strip should be re-designed
- HV problems will be investigated further after current testbeam effort

- Questions:
  - Should the shield plates be equipped with resistors to limit currents?
  - Would this make problems with response time (slower discharging at trip)?