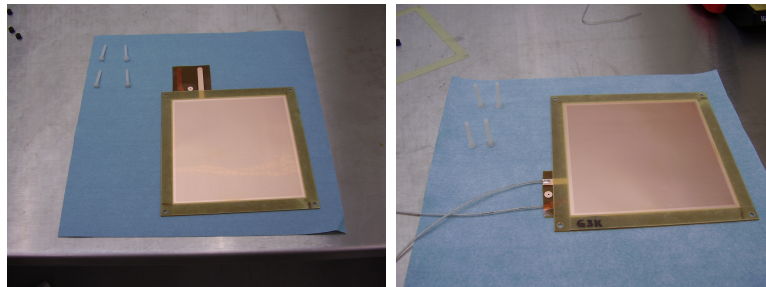


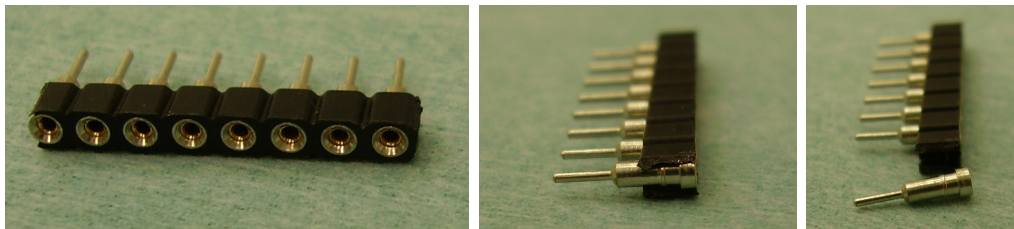
Mounting the Readout of the TPC Prototype

1 Preparing the GEMs Only if the GEMs are replaced

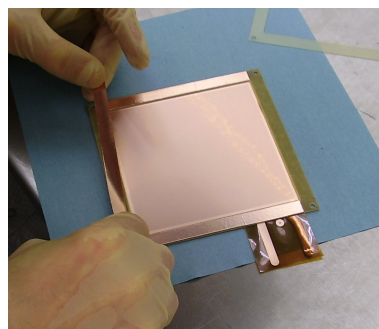
- The GEMs have a long connection lug (left), which is shortened before the wires are soldered to it (right).



- At the other end the connector pins are soldered. They are the inner part of one pin of a standard hq IC connector socket. Use cutting pliers to break the plastics housing and take out the inner part.



- The frame of the GEM facing the drift volume has to be clad with a copper foil (self adhesive copper tape), so the inhomogeneous field at the edges of the GEM cannot penetrate into the drift field.

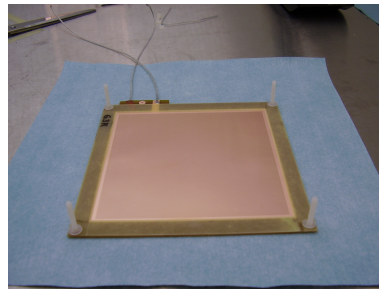


2 Mounting the GEM Stack

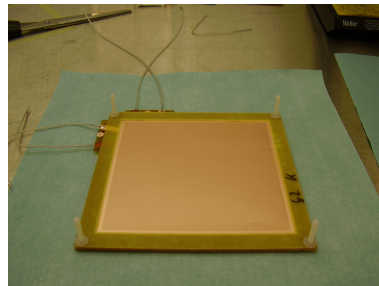
- To mount the GEM stack four plastic screws are used. The head has been thinned to match with the small gap between the lowest GEM and the readout board (left screw in picture)



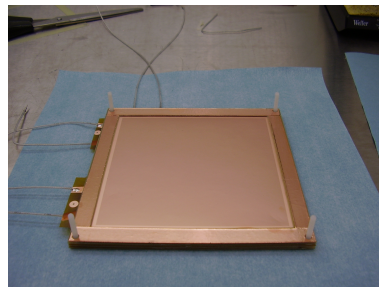
Take the four screws and insert them into a GEM. Afterwards put one spacer ring on every screw.



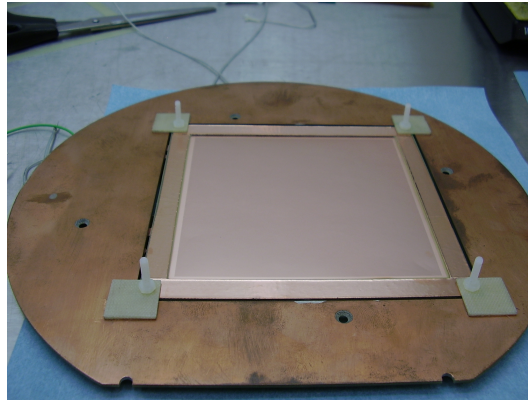
- Mount the second GEM and take care the connectors are arranged correctly (the connection lugs are at different positions). Again, put a spacer ring on each screw.



- Mount the last GEM with the copper coating and again arrange the connectors so they don't interfere with the other two GEMs. This time no spacer is needed.



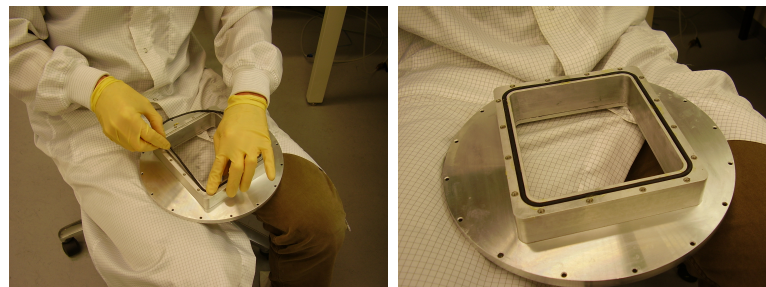
- In a last step the shield is mounted onto the stack. Again, take care of correct orientation. Fix everything with the nuts.



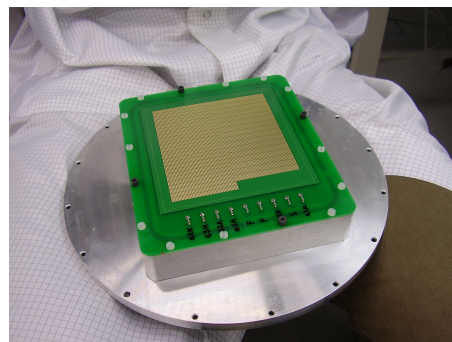
- Without photo: The copper coating of the GEM frame is connected to the copper of the shield.

3 Assembling the End Plate

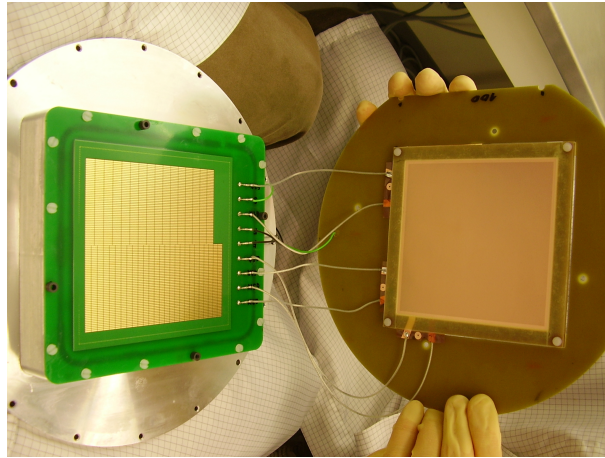
- First the rubber seal is inserted into the aluminium frame. Vacuum grease holds it in place so it does not slip out off the groove.



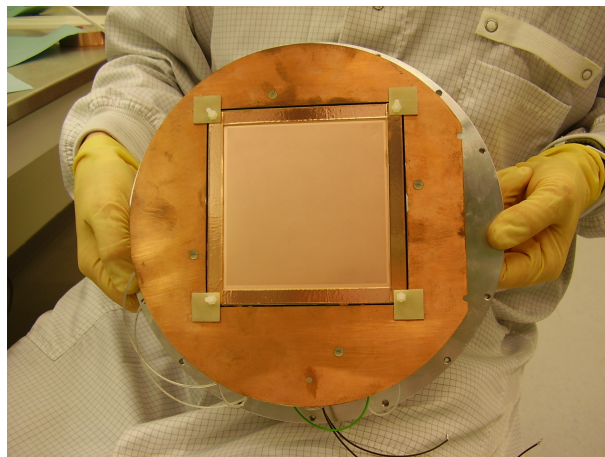
- Now the readout board is mounted. Four screws are left out where the longer screws, which hold the shield with the GEM stack, are inserted. At these positions the small spacer cylinders are placed.



- The electrical connections for the GEMs and the shield are connected. Don't forget to also connect the two wires to contact the first strip of the field cage.

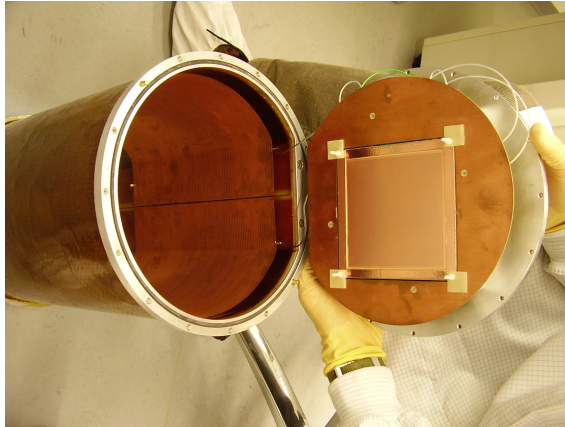


- Place the shield with the GEM stack to the right position and fix it with the countersunk screws. It is a bit tricky to put the screws through the spacing cylinders. Now the end plate is ready to be inserted into the field cage.

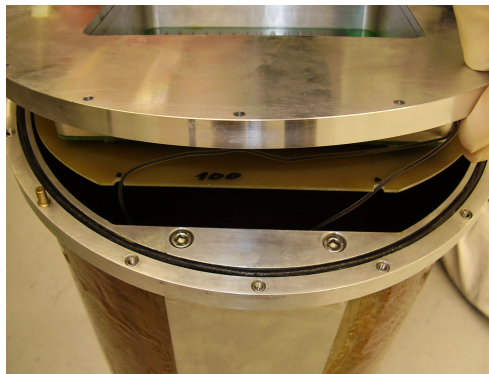


4 Inserting the End Plate

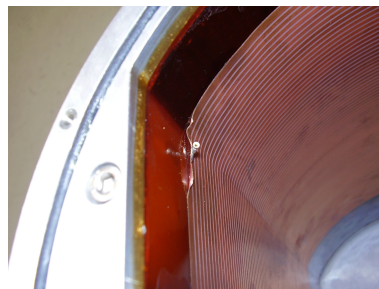
- Insert the gas seal. Again use vacuum grease so it does not slip out off the groove too easily.
- Connect the two wires to the connectors on the first field strip.



- Carefully insert the end plate. The wires have to be in the notches in the shield.



Don't use too much force. If the wire is not in the correct position, i. e. not running through the notch, and the plate does not move in smoothly you might damage the field strip and the connector.



- Fix all the screws, the camber is closed now.

5 HV Connections

- When first assembling the chamber the outside HV connections have been connected after mounting the pad plane on the end plate. It might be necessary to unsolder them to remove the pad plane (which is not necessary to exchange a GEM foil).



- There are two important things to close the 30 kV resistor chain:
 1. The large 50 M Ω resistor has to be connected to ground!
 2. The ground of the anode and cathode side have to be connected! Otherwise the resistor chain is broken!