# Micromegas (Ingrid)+TimePix 8-chip modules

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LCTPC Collaboration Meeting - DESY

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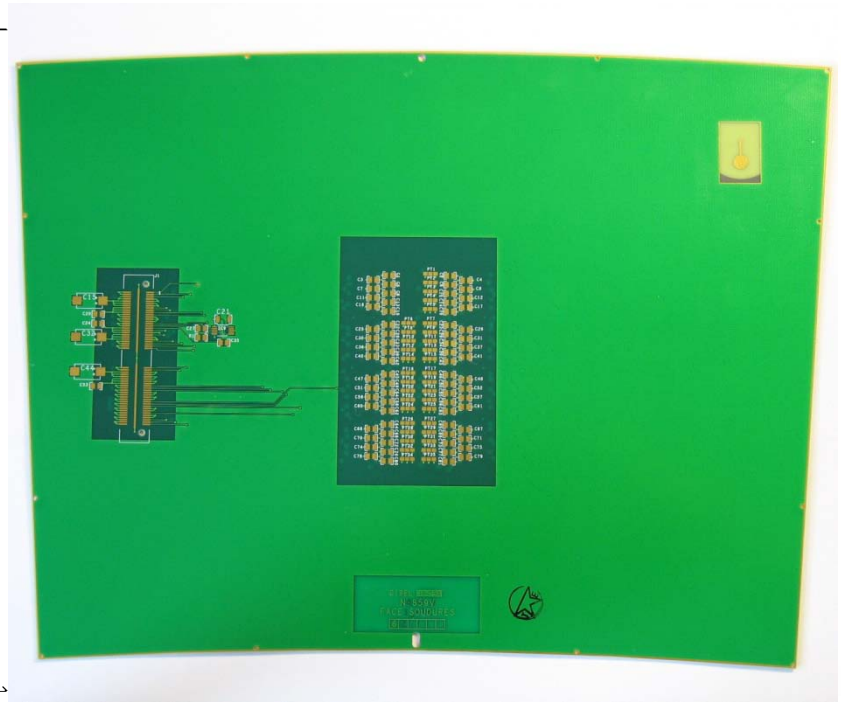
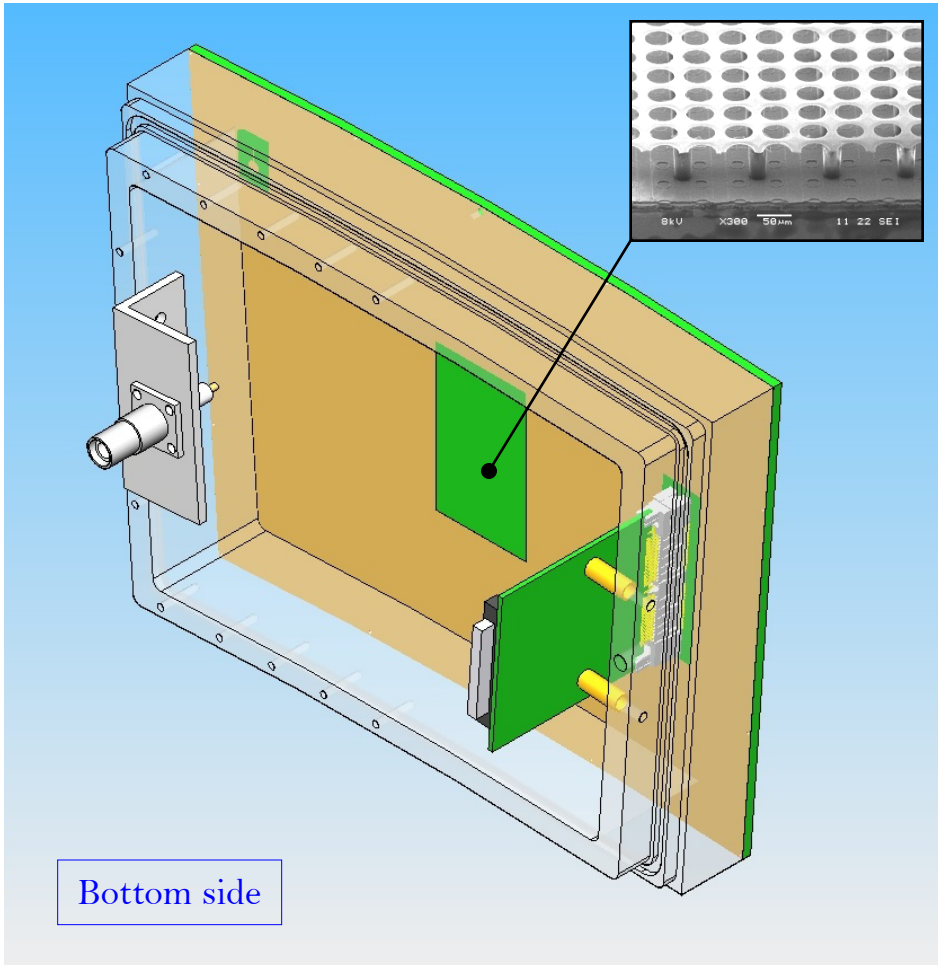
# Outline

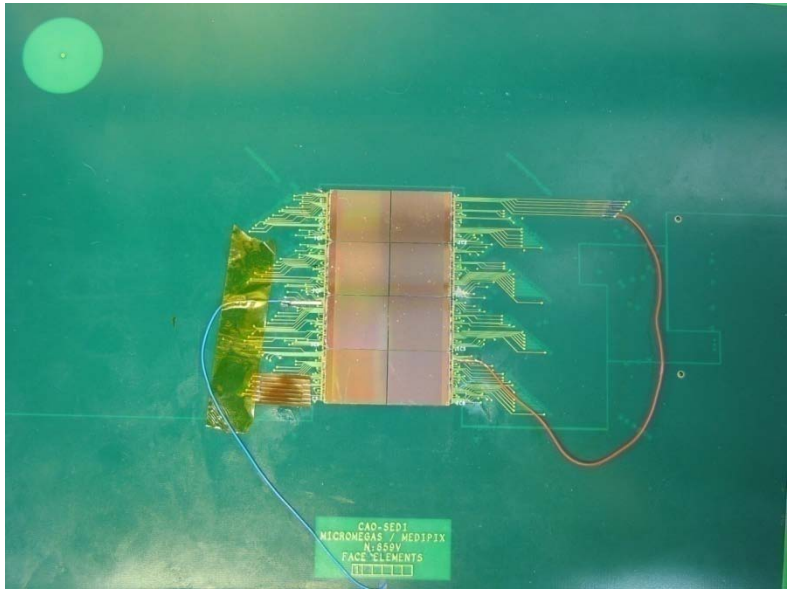
- Module TimePix + Integrated Micromegas (Ingrid)
- Electronic tests
- Design of a new board
- Status of the Ingrid
- Prospects

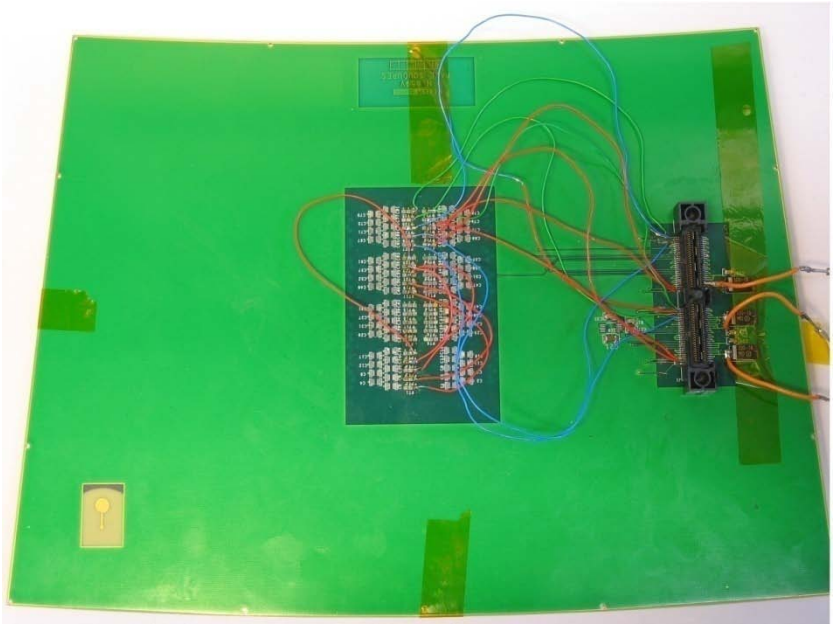
- TimePix pannel with a 2x4 matrix of TimePix chips + InGrids for the TPC Large Prototype
- 6-layers PCB
- Transfert card for VHDCI cable



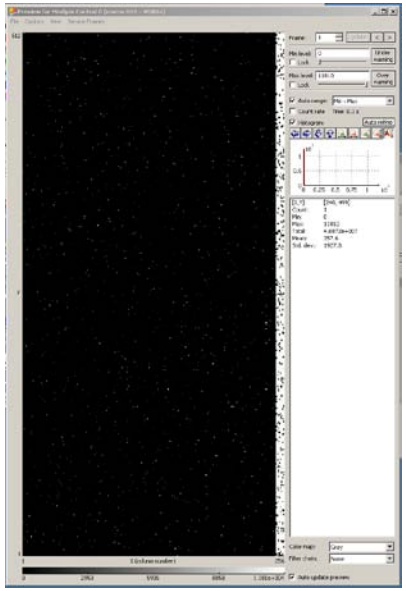



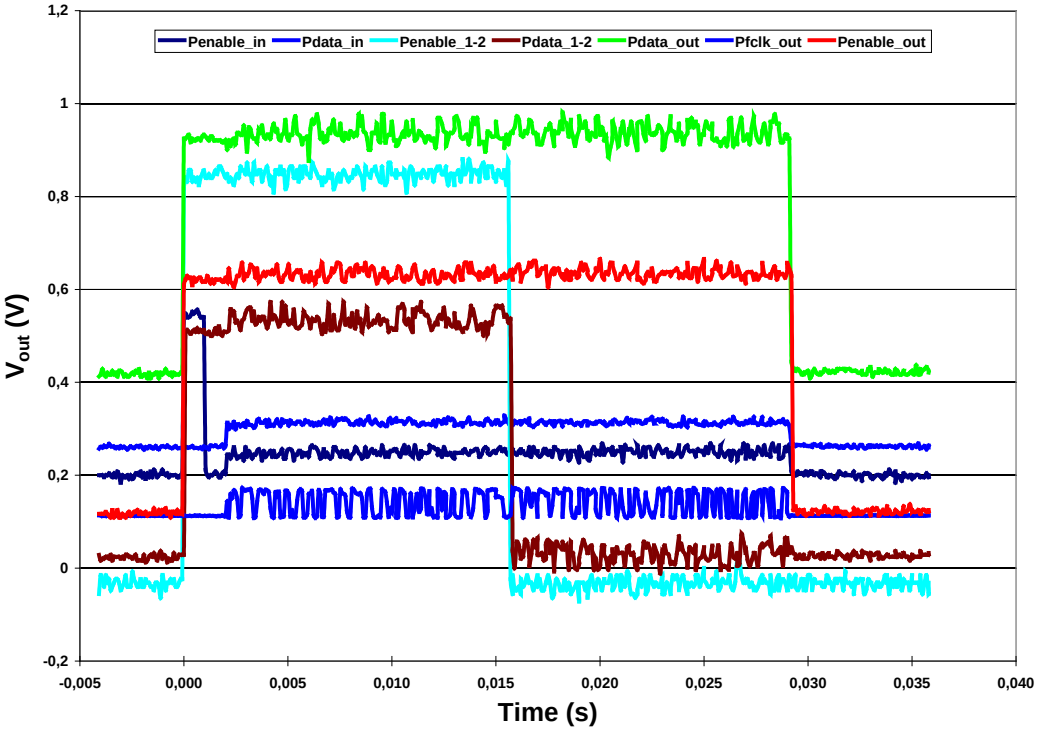
- 8 TimePix chips have been connected on the PCB
  - issues for the wire bonding
  → two chips were broken by the bonding factory
- Electrical test
  - an error of routing was found and corrected using external wires
  - power supply by MUROS only was insufficient (0.2 A per puce)
  → 3 voltage to stabalize (LV) to 2.2V

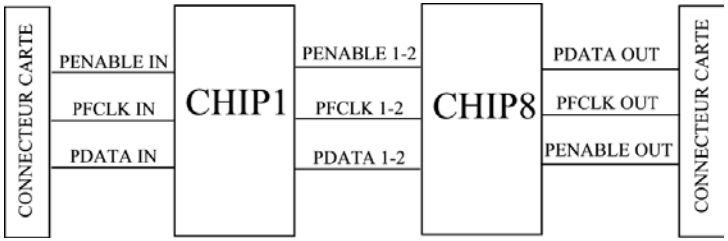


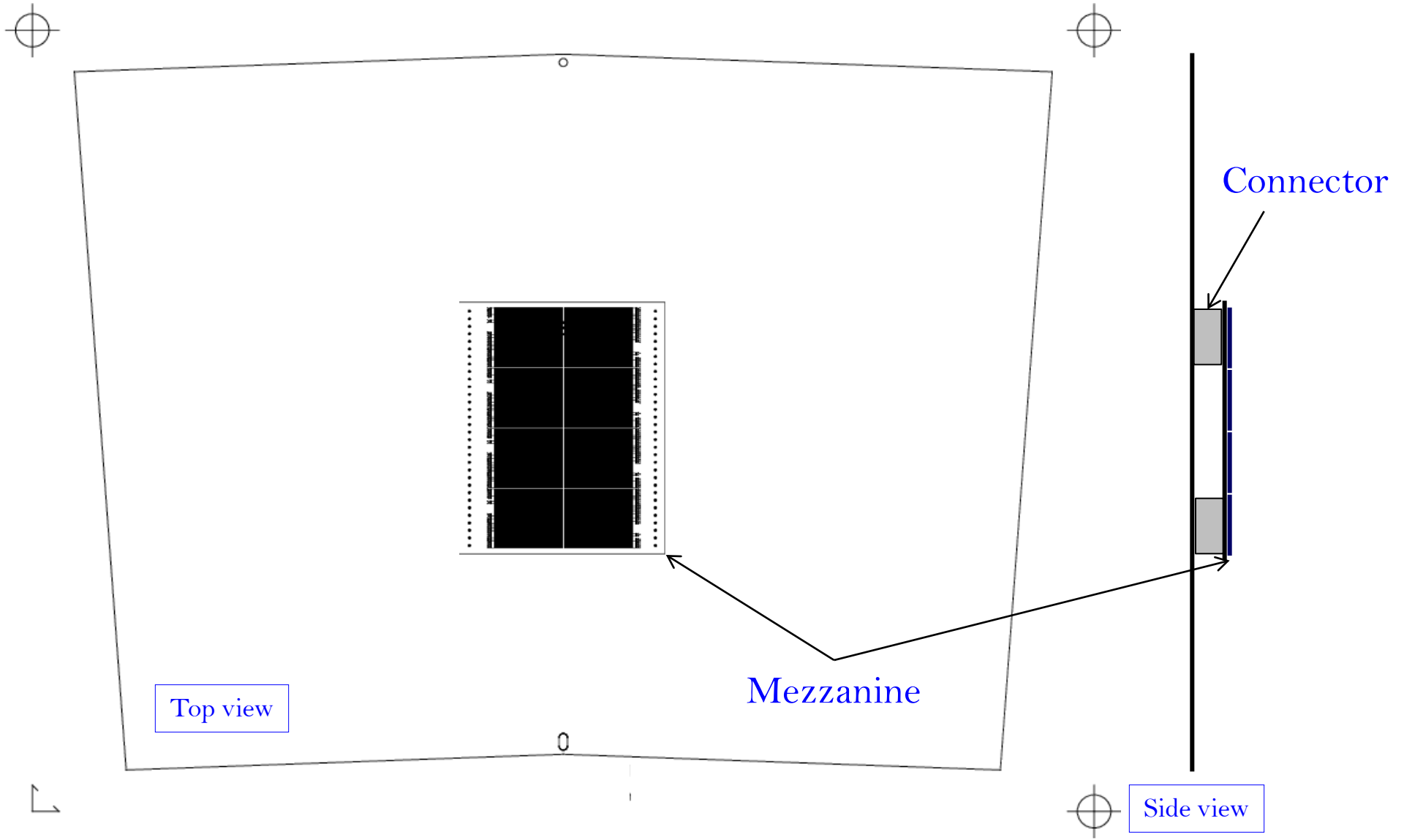
- The 8 chips were removed and replaced by only two
- New test at CERN (January 20th, 2009)
  - the hardware was validated
  - but, correction needed in the official software Pixelman





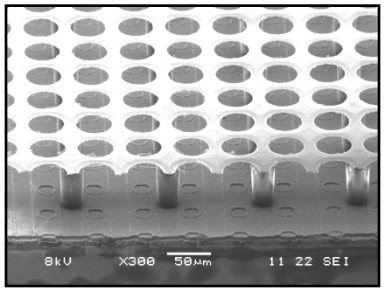



# Design of the new board



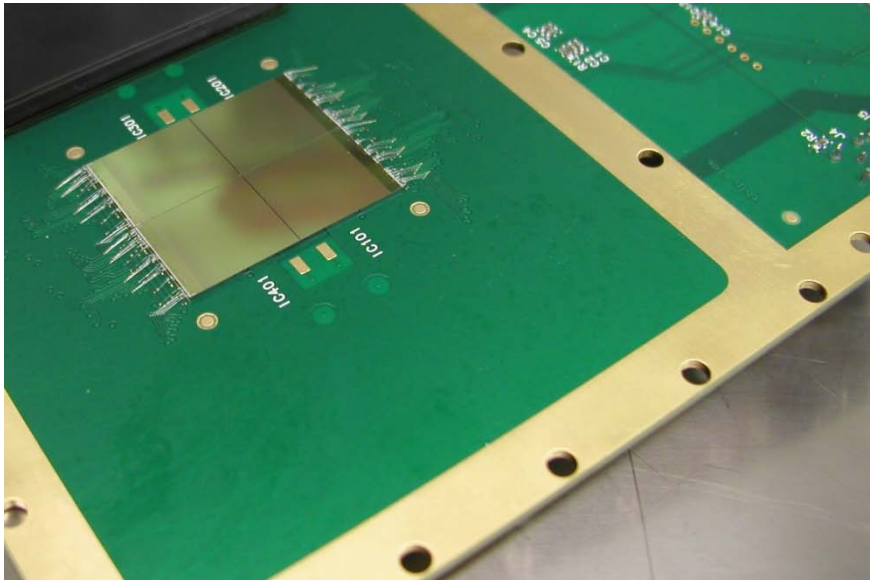
# New card in progress

- A new card was designed taking into account what we learn with the previous
- New design :
  - the 2x4 matrix is place on top a mezzanine to make easier the wire bonding
  - power regulators was implemented
- Waiting for Ingrid

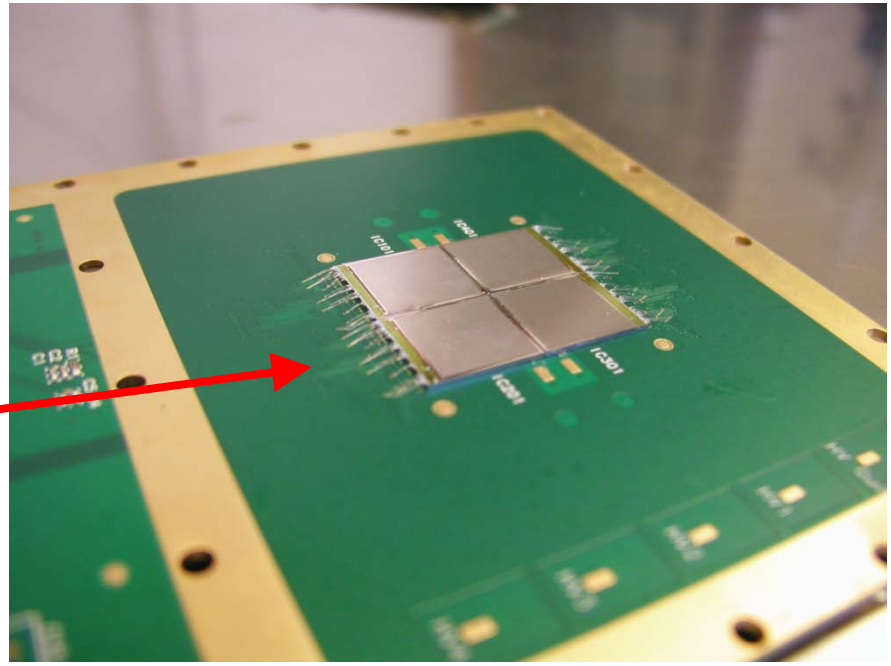



- Should be tested on the Large Prototype TPC by the end of this year or beginning of next year

# NIKHEF: emphasis on Ingrids

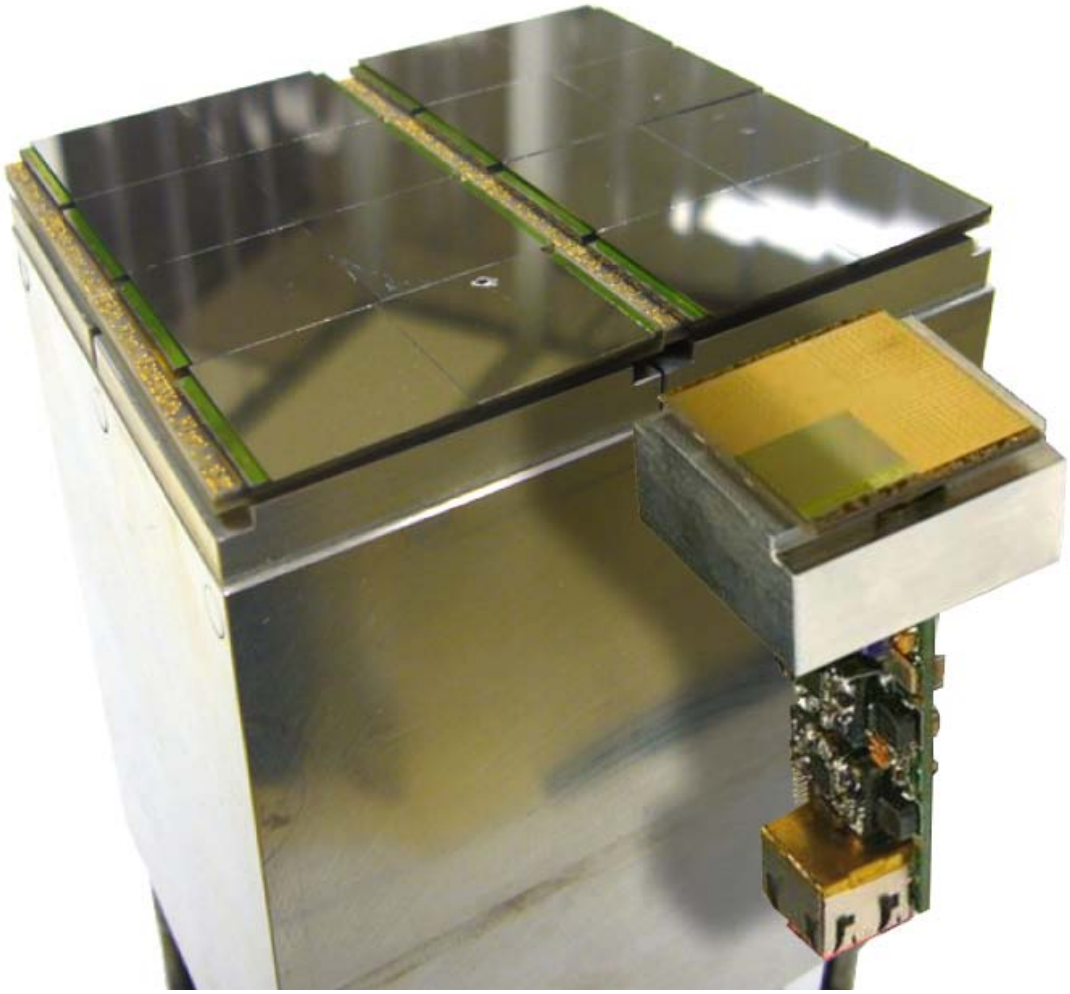


- within RELAXD project: 4x4 Medipix chips in compact mounting
- will evolve in 8x8 Timepix chips for EUDET



- QUAD chips board tested OK in 2008
- Equiped with Ingrids in June '09
- Could become standalone "traveling" TA infrastructure

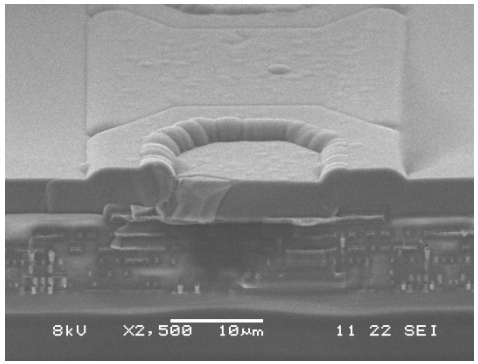
# NIKHEF prospects



- within RELAXD project: 4x4 Medipix chips in compact mounting
- will evolve in 8x8 Timepix chips for EUDET

Several single chip systems produced for:

- Test detector performance with different thickness of $Si_3N_4$ protection layers (in DESY T22 beam)




- Test efficiency and resolution in Gossip-like geometry (only 1.5 mm gas layers) in CERN testbeam

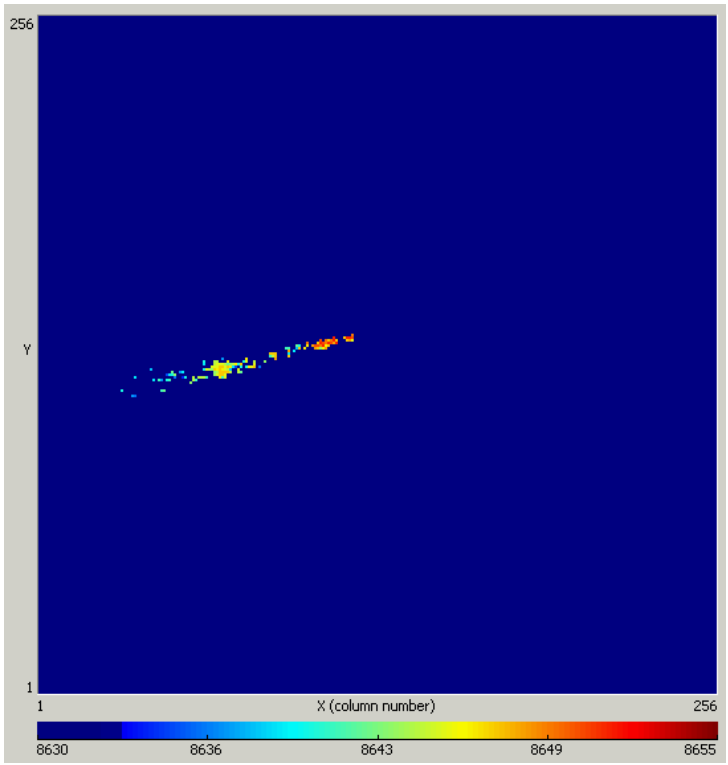
- Data analysis in progress
- Sometimes still discharges that kill Timepix chips;
  some indication it is on the 'outside' edges of Ingrid/Timepix

# Conclusions

- The electrical tests of the first board were helpful
- Waiting for Ingrids to equip the new board when it will be ready
- Next step: install and test it in the LP1 (2010)
- Studies in parallel with RELAXED project/Gossip at NIKHEF
  → 8  8 matrix in LP1

# The TimePix Collaboration

- **Saclay CEA/IRFU** — *David Attié, Paul Colas, Maxim Titov, Xavier Coppolani, Eric Delagnes, Arnaud Giganon, Yannis Giomataris, Marc Riallot*
- **NIKHEF** — *Arno Aarts, Yevgen Bilevych, Harry van der Graaf, Martin Fransen, Jan Timmermans, Jan Visschers*
- **Univ. Twente/Mesa+** — *Victor Blanco Carballo, Cora Salm, Jurriaan Schmitz, Sander Smits*
- **Univ. Freiburg** — *Andrea Bamberger, Uwe Renz*
- **Univ. Bonn** — *Klaus Desch, Jochen Kaminski, Frederik Klöckner*
- **CERN** — *Erik Heijne, Xavier Llopart, Medipix Consortium*




TimePix + Standard Micromegas, $^{90}Sr$

In Ar/Iso-$C_4H_{10}$ 5%