

Prospects and Benefits of Freiburg joining RD50

Karl Jakobs & Ulrich Parzefall
Universität Freiburg



Overview



- Freiburg & HEP Group
- Present Activities & Projects
- Why we want to join RD50



High-Energy Physics in Freiburg



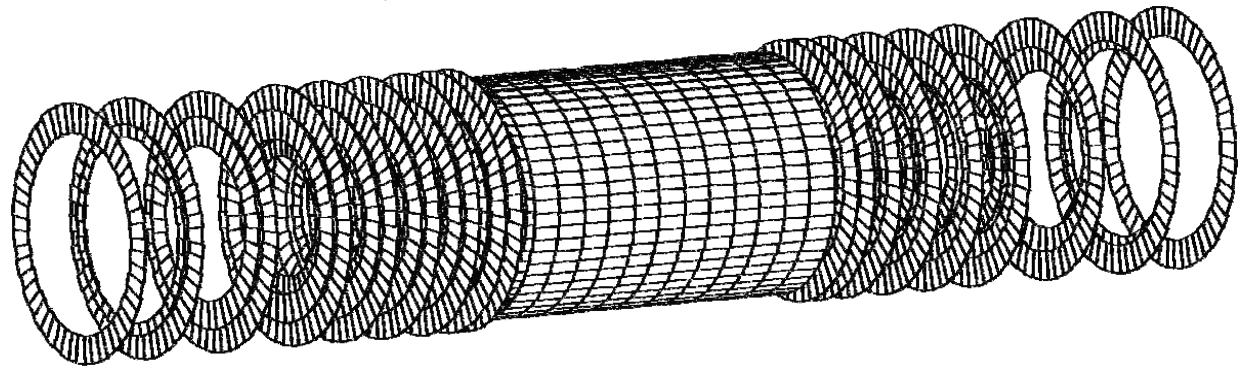
- The University of Freiburg
 - funded 1457
 - 22'000 students (600 in physics)
- HEP is major physics activity in Freiburg University
 - 3 chairs on HEP, with 7 professors
- Our group (lead by Karl Jakobs):
(see <http://wwwhep.physik.uni-freiburg.de>)
 - 2 professors, 2 lecturers, 4 postdocs, 9 Ph.D. Students

Current HEP Research



- ATLAS:

- SCT Endcaps (procurement and QA of hybrids, module building and QA)
- Preparation of physics analyses (Higgs searches, particle ID: tau-reconstruction).



- DO:

- physics analyses (SUSY & Higgs searches) and running of calorimetry

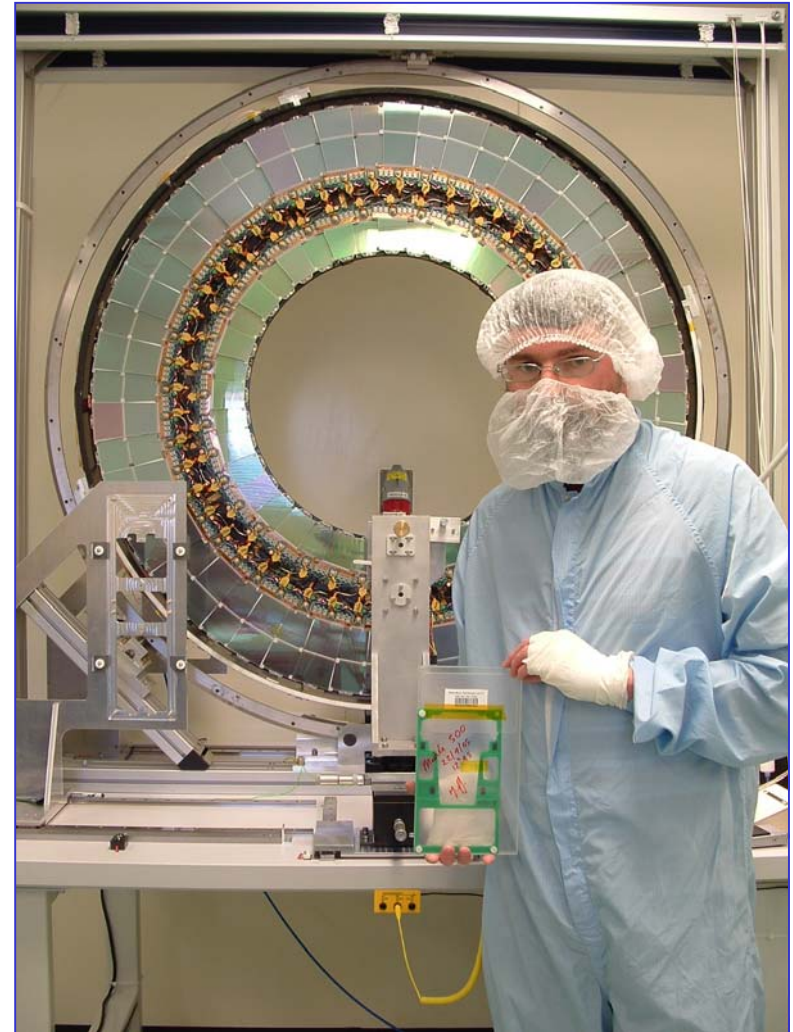
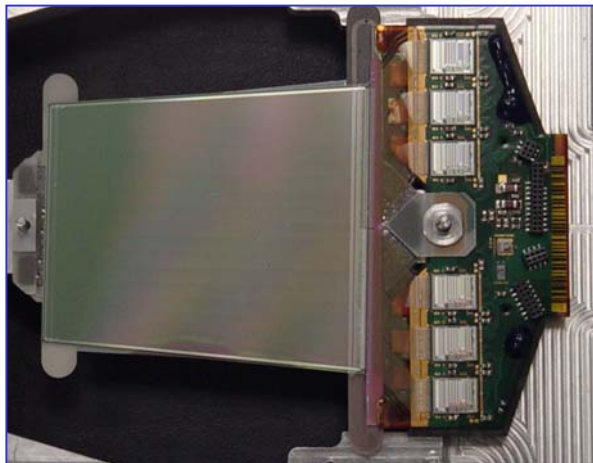
- Medipix:

- flip-chip bonding, Cd-Te Medipix assemblies

Current HEP Activities



- ATLAS SCT Hardware mostly complete
 - SCT Endcap hybrids:
 - Designed, produced (2500, industry), tested (1000 in FR), now mostly done...
 - (210) 95% of Freiburg SCT modules built by now
 - Some efforts to be dedicated for SCT commissioning, running, etc
 - Many resources will be freed from SCT project



Available Personpower for RD50

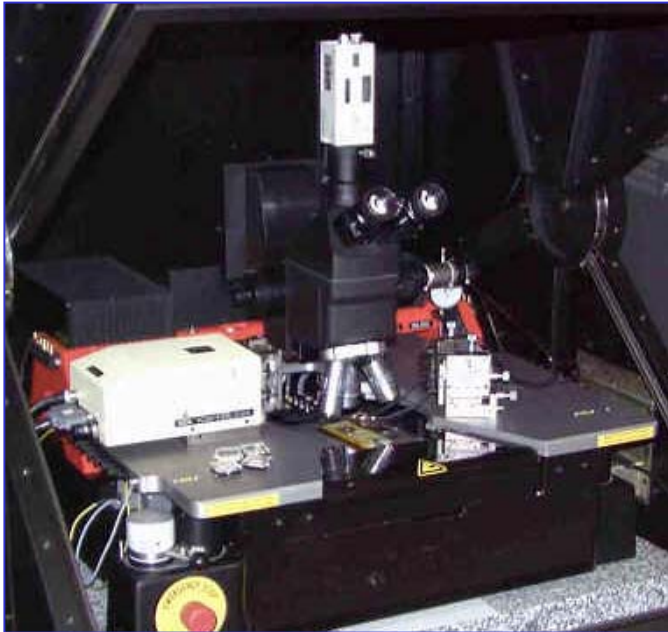


- Karl Jakobs (Senior Scientist, group leader), 10%
 - Ulrich Parzefall (Senior Scientist, RD50 contact person), 40%
 - NN (PhD. Student), 100%
 - Thies Erich (Diploma Student), 70%
 - Dieter Joos (El. Engineer), 50%
 - Ines Messmer (Technician), 30%
 - Total : 3 FTE
-
- Additional support from el. & mech. workshop

Available Resources for RD50



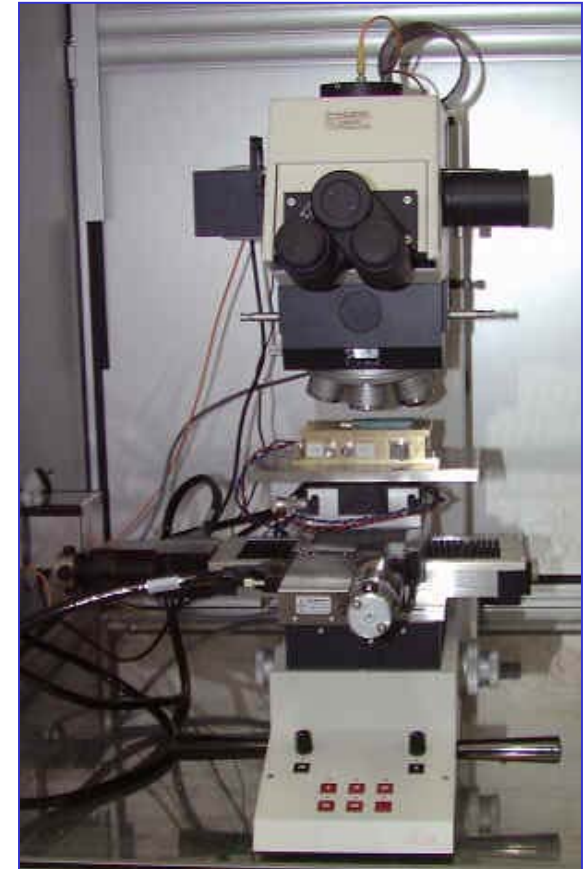
- Class 10000 / 100 clean-room
 - Used for SCT module production until end of June
- Sues PA 200 automatic probe station



Available Resources for RD50



- Laser tester with X-Y-stages
 - Used during SCT-prototyping for sensor/module characterisations
- Delvotec 6400 automatic wire bonder
 - Dage 4000 wire pull tester



Available Resources for RD50



- Semi-automatic metrology microscope
- Janome glue robot
- Finetech flip chip bump-bonder
 - Used for eg Medipix assemblies to 3d detectors and CdTe sensors
- Readout systems for SCT hybrids/modules (4)
- climate chamber
- various other stereo microscopes

Planned Research in RD50 ATLAS



- Freiburg will participate in upgrade of ATLAS tracker
 - Experience from hybrids and modules useful
- Interested in building prototype modules
 - At present focus on most promising RD50-Materials (Czochralski, P-Type,...)
 - Connect with real SCT hybrid
 - Read out with SCTDAQ (official SCT system for module tests, testbeams, ...)
 - Should allow realistic measurements of occupancy, efficiency and S/N
 - Comparable to SCT measurements

Planned Research in RD50 3D-Detectors



- Experience with assemblies of Medipix and 3D-Detectors exists
 - Collaboration with Glasgow
 - Bump-bonding at Freiburg
- Freiburg also signatory of RD50 funding request for first industrial scale production of 3D detectors (lead by R. Bates)
 - Bump-bonding again
 - Test of strip detectors

Conclusions

- Freiburg is large HEP group, with involvement in ATLAS, D0 and Medipix
- Relevant experience on semiconductor detectors
- Freiburg would like to join the RD50 collaboration
- Could make useful contributions to full detectors and 3D on short timescale
- Main research lines would be
 - ATLAS Tracker upgrade
 - 3D Detectors