# CERN and technology transfer in Poland


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# Outline

Organisation of Technology Transfer in Poland

Examples of experience/knowledge transfer

Why Particle Physics technologies?

Our initiative

Technology Transfer in practice – examples

Conlusions

# Organisation

Technology Transfer Offices are installed at all major Universities

Their mission is:

- promotion of research results
- searching for industrial partners
- organisational support in establishing formal co-operations with industry, licence agreements, know-how transfer
- patent applications
- help with various IP issues
- training
- help with searching funds

*All this sounds good, but ....*

# Particle Physics – Technology Transfer

Particle Physics groups at the Universities are supposed to obtain basic organisational support from the Technology Transfer Offices

TT officers are often not familiar with specific aspects of technology development related to experimental techniques in Particle Physics (except Warsaw University – W. Dominik)

Particle Physics groups are usually only small fractions of Physics Faculties and even smaller of entire Universities

In the research institutes (INP PAN, ISNS) no formal TT offices are in place, though good examples of TT exist.

# Examples of knowledge/experience transfer

**Companies created and/or lead by former members of PP groups in Poland**

- INVENTOR  (composite materials)
- Nowoczesna Elektronika (Modern Electronics)
- Gridwise Tech
- NASK (internet services and development)
- IdS foundation (internet for schools)
- Geva & Metron (detectors)
- ATM (telecom)

# Examples of knowledge/experience transfer

**Common R&D projects between PP groups and Polish industry**

- AGH – INP PAN – Institute of Electron Technology (silicon detectors)
- Warsaw University – Tele & Radio Research Institute (Printed Circuit Board technology)
- INP PAN – AGH – Fideltronik (HV Power Supplies for the ATLAS SCT)
- AGH – Evatronix (VLSI Application Specific Integrated Circuits)

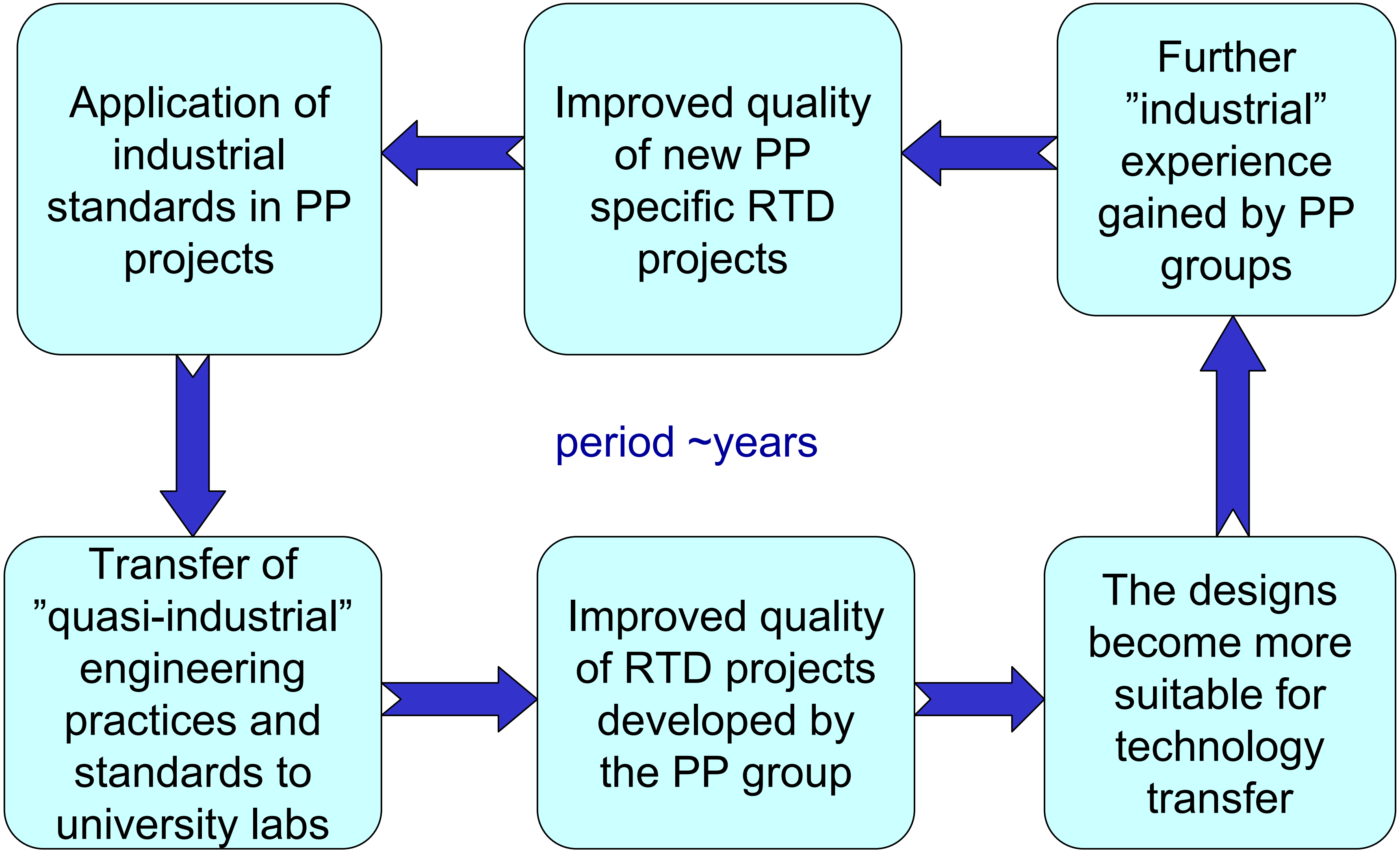
# Why PP technologies?

Requirements of PP experiments are closer to industrial standards compared to other fields of science

- Large scale production with involvement of industry
- High reliability required
- Design ”for manufacturing” required
- Long term support (spare components, obsolescence of technologies,etc.)
- Economical constraints
- 

All these make the PP technologies matured and so more suitable for potential transfer – providing they match the needs of other fields

# Relation between PP and industry



# To improve the situation

An initiative (INP PAN, AGH-UST, U. of Warsaw, SINS) has been started to establish a cross-institutional Technology Transfer Office specific for Particle Physics between major Particle Physics groups with the scopes:

- promote technologies emerging from Particle Physics, in particular those developed in Poland or with involvement of Polish groups
- organise financial support for further development of selected technologies in the Institutes
- cooperation with the University Technology Transfer Offices

*So far we have not been successful in obtaining funding for such an office.*

# Technology Transfer in practice

Open science – publications – see example

Research contracts with industry – see  example

Licensing and patenting

- potential conflicts between publishing and patenting priorities
- in most cases an ”invention” (in detector technologies, for example) is not one step act but it is rather long term iterative process
- resolving IP issues for ideas developed in broad international collaborations may be difficult
- profits vs. costs are often doubtful

# Fast CMOS Binary Front End for Silicon Strip Detectors at LHC Experiments

J. Kaplon and W. Dabrowski

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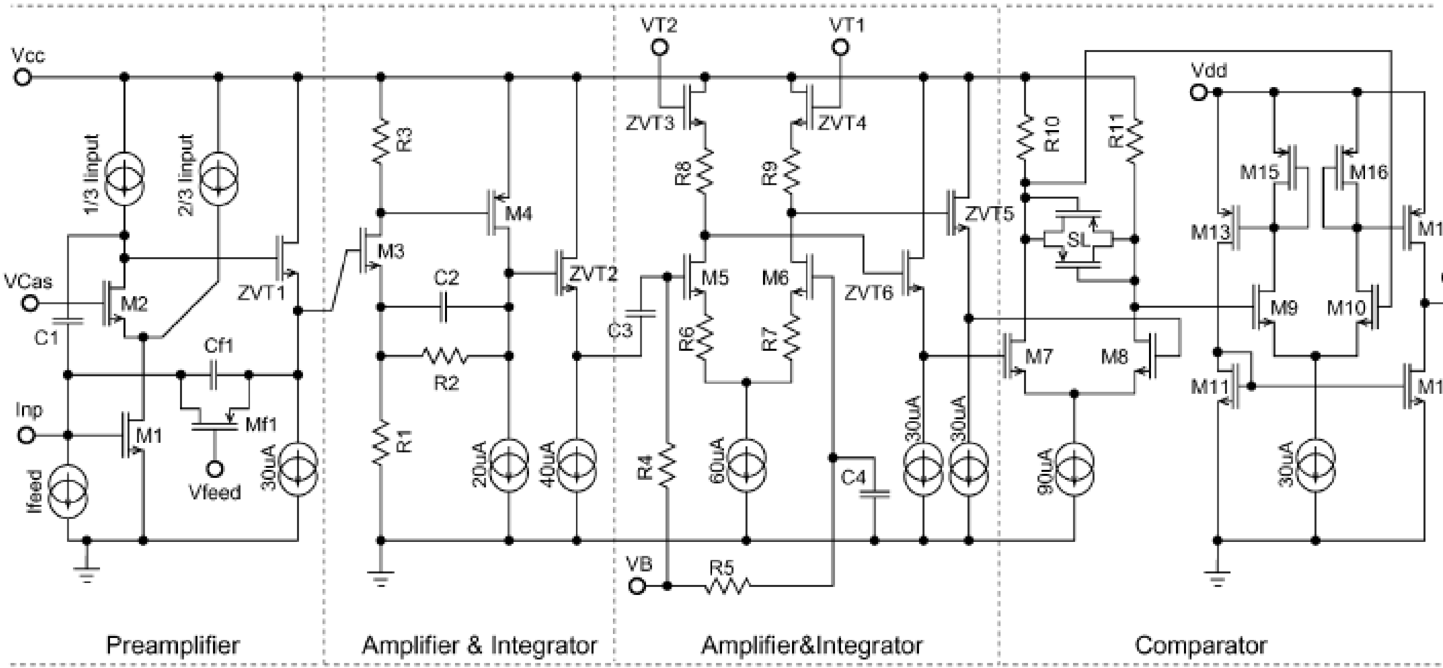



Fig. 1. Schematic diagram of one channel of the ABCDC1 chip.

# Photon Counting Energy Dispersive Detector Arrays for X-ray Imaging

J.S. Iwanczyk, E. Nygård, O. Meirav, J. Arenson, W.C. Barber, N.E. Hartsough,
N. Malakhov and J.C. Wessel

J.S. Iwanczyk, E. Nygård, W.C. Barber, N.E. Hartsough, N. Malakhov and J.C. Wessel are with DxRay Inc., Northridge, CA 91324 USA.
E. Nygård, N. Malakhov and J.C. Wessel are also with Interon AS, Oslo, Norway.
O. Meirav and J. Arenson are with GE_ Healthcare, Ltd., Haifa, Israel

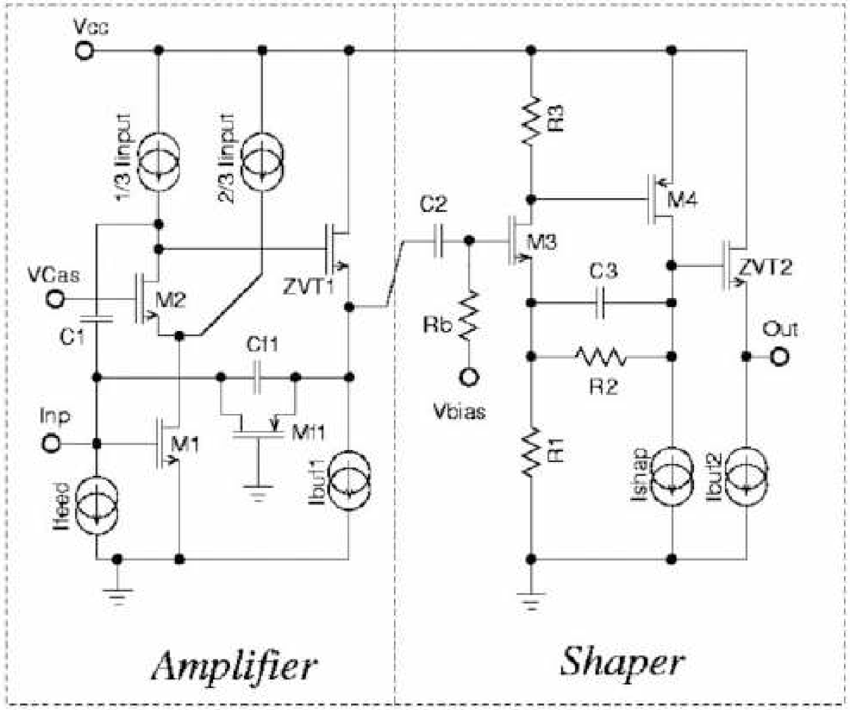



Figure 10. Principle schema of the amplifier

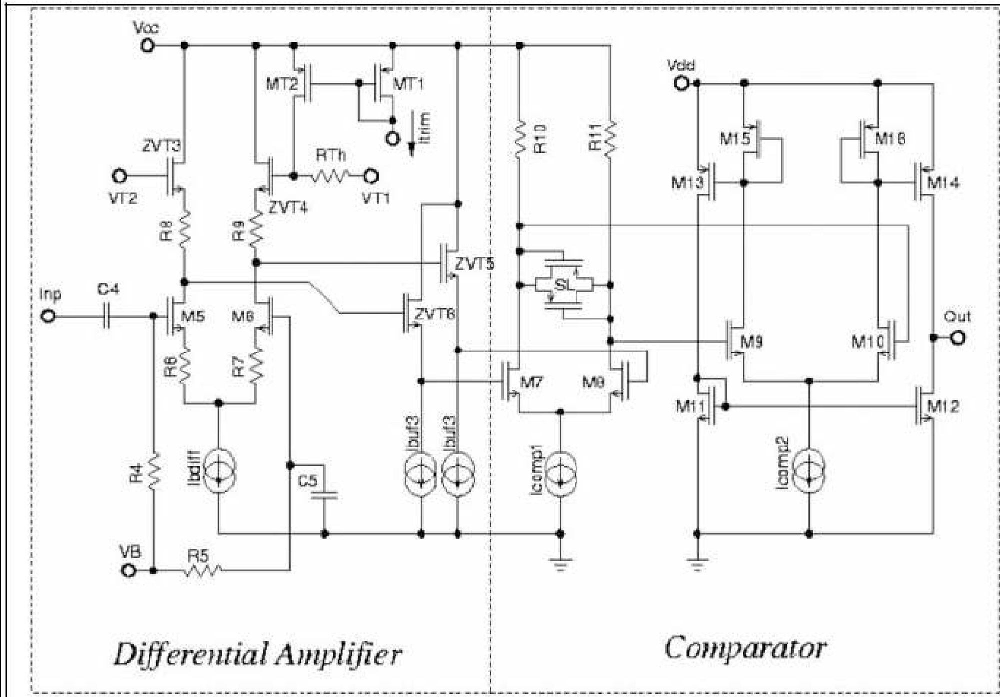
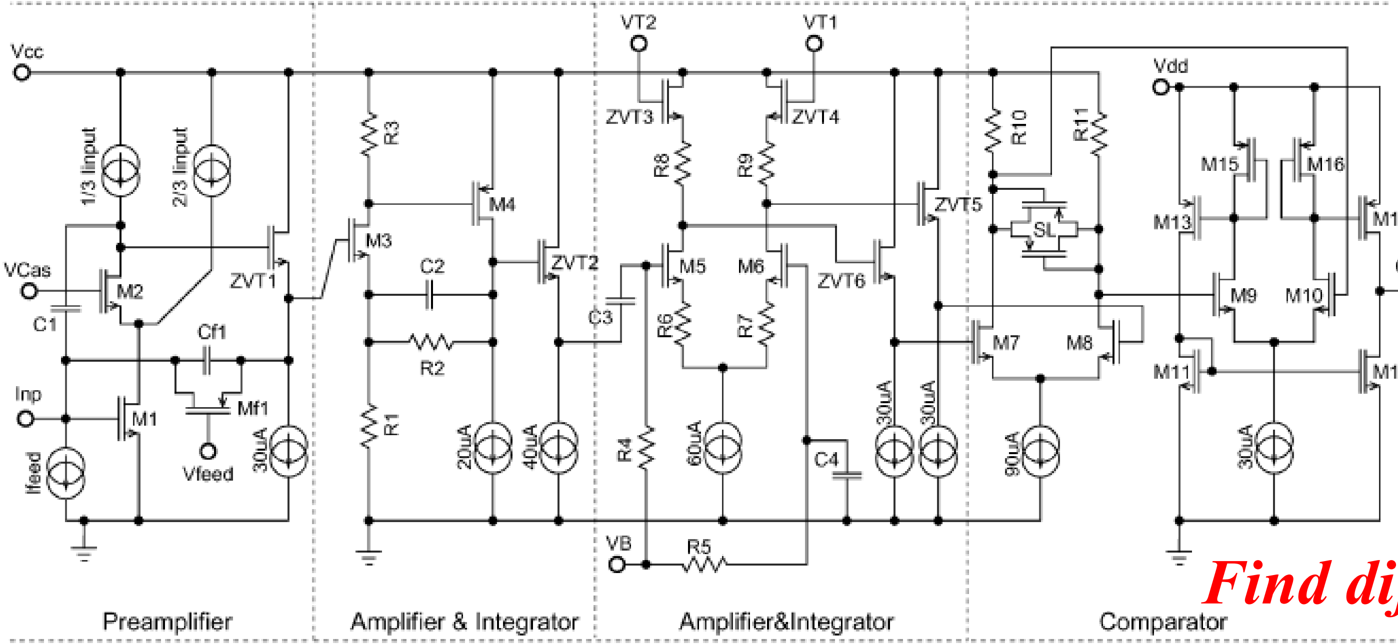



Figure 11. Principle schema of discriminator

**Find differences**

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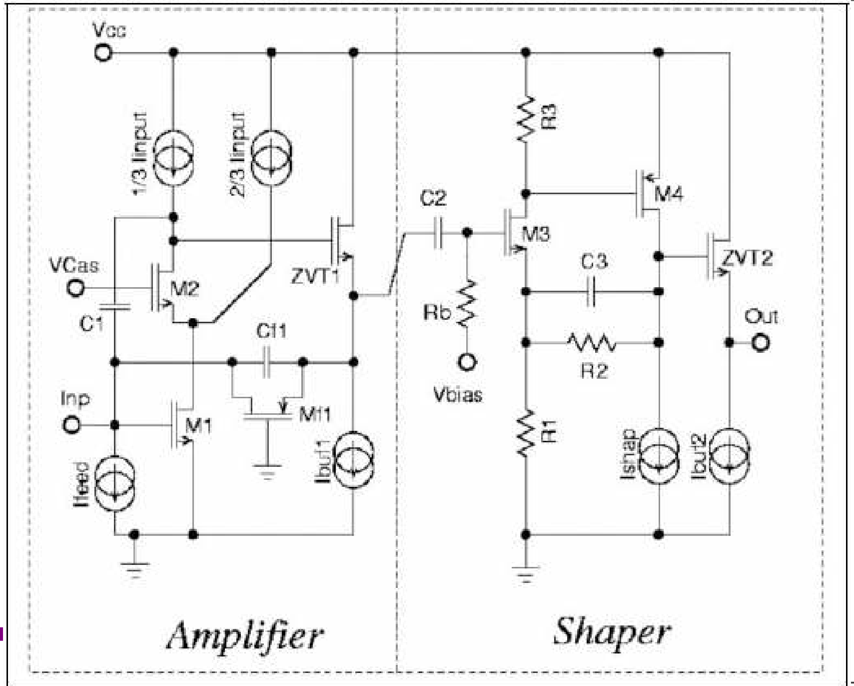


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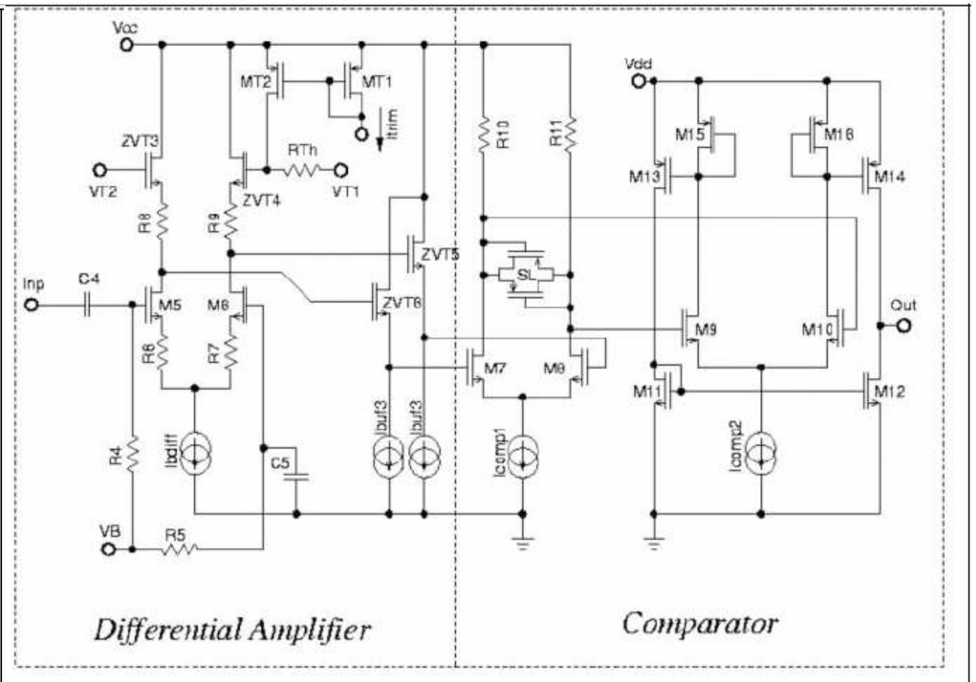



Figure 11. Principle schema of discriminator

# Observation

Technology Transfer of openly published results takes place and it often runs out of our control

We may try to have some influence/control on such processes

There is always important ”know-how” behind open publications

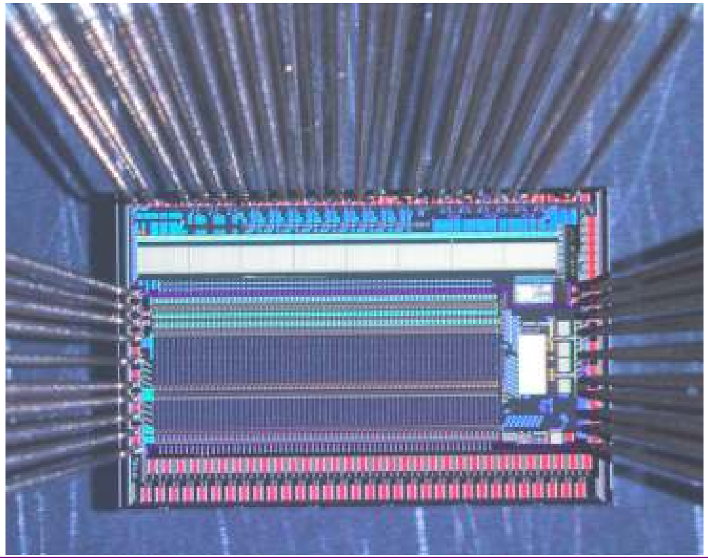
N.B. ”CERN originated” technologies have often other origins in other groups from the member states

# Position sensitive detector for X-ray diffraction

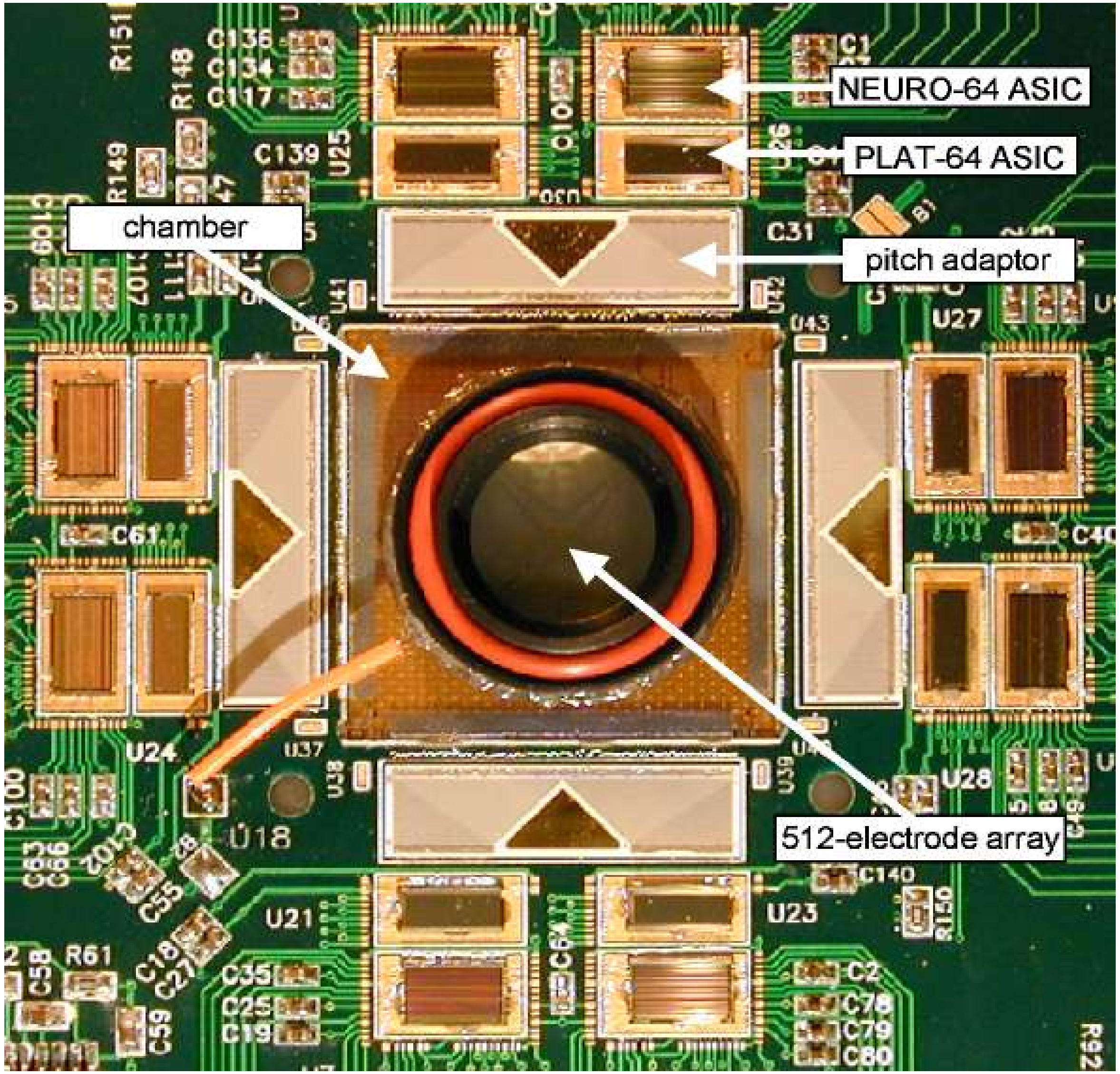

Developed in the frame of a research contract between

AGH-UST Krakow and Bruker AXS Krlsruhe

Based on silicon strip detector and ASIC technologies similar as used for tracking detectors in PP experiments



# Transfer of PP technologies to other fields of science




A system for recording signals from live neural tissue (e.g. retina)

Developed in colaboration between

AGH-UST Krakow and UC Santa Cruz

Used now routinly by neuroscientist and delivers really new results in neuroscience

Potential applications to retinal prostesis, other neuropestesis

# Conclusions

Many technologies developed for PP experiments in Polish PP labs are novel and unique and potentially suitable for other applications

Making these technologies transferable to industry requires usually substantial dedicated effort

Improving effectiveness of the Technology Transfer requires some support (organisation, and funding) organised within the PP community, as a first step

High risk associated with TT actions has to be recognised and accepted

Continuous promotion of PP technologies in the society should be our duty