
# TALENT Initial Training Network

DESY, Hamburg, Germany
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on behalf of TALENT Project Coordinator
Dr. Heinz Pernegger
CERN ATLAS Collaboration

# What is TALENT?

- **Training for career development in high-radiation environment technologies**

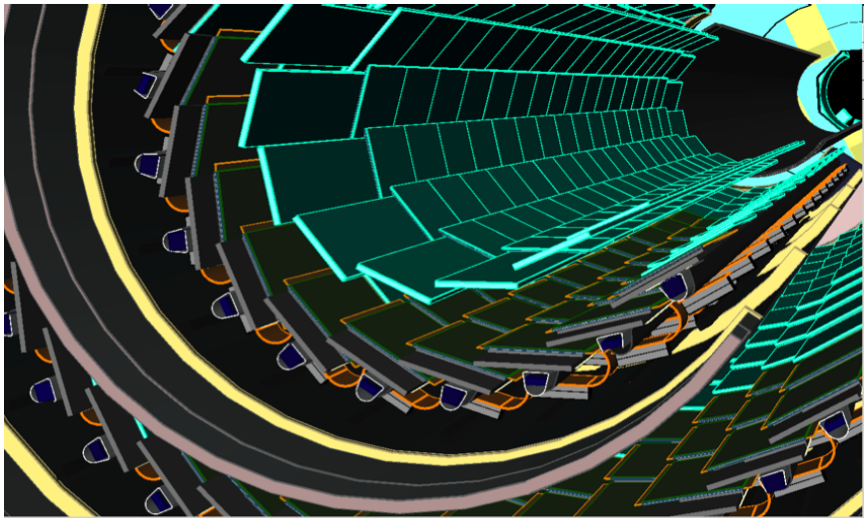
- FP7 ITN Project taking place in 7 European countries
  - 4-year multisite Initial Training Network, € 4.5 M budget

- 17 Researchers
  - 15 Early Stage Researchers
  - 2 Experienced Researchers
  - 2 research facilities
  - 7 universities
  - 8 industrial partners

- **Currently recruiting!** Running until 2015

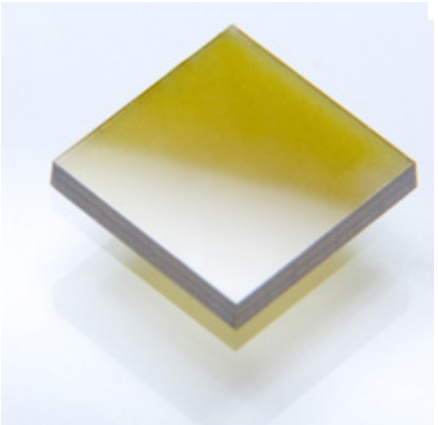
# What is the training about?

- **CERN LHC upgrade, ATLAS Insertable B-layer detector**
  - The aim of the TALENT is to provide top notch research to upgrade the CERN LHC
  - Developing new state-of-the-art technologies for a new precision pixel detector for the ATLAS experiment, the Insertable B-layer detector (IBL), and for future precision tracking detectors



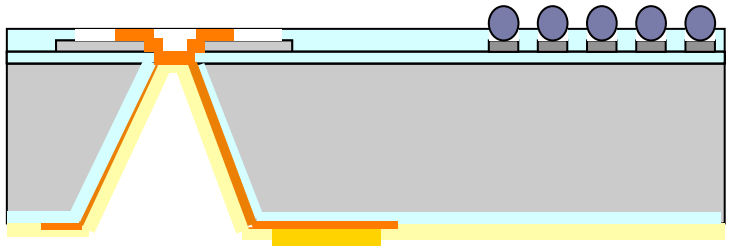
# WP2: Precision Sensors

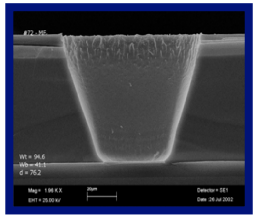
- **Optimizing different designs for IBL**
- 3 sensor technologies under investigation: silicon planar, silicon 3D and CVD diamonds
- Measure charge collection properties
- Investigate radiation hardness
- Study designs for pixel detectors and beam monitors



# WP3: Electronics and Interconnection

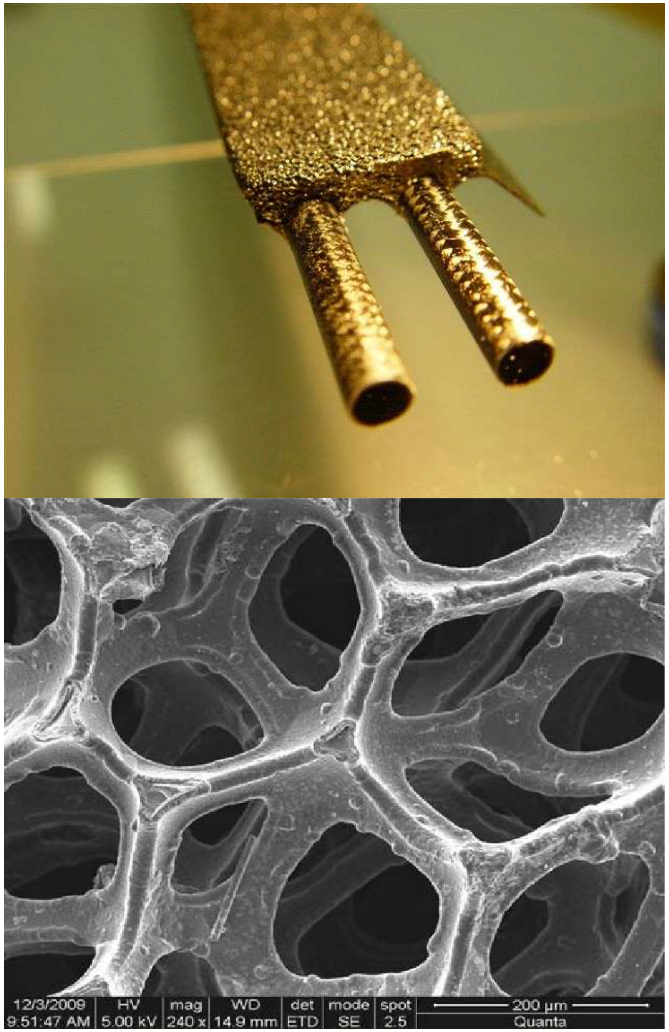
- New **data transmission** and off-detector **readout** system
- Qualification and **system testing** of readout and powering systems
- Research in **3D integration methods** (through-silicon-vias) for future high-density pixel detectors
- New powering schemes for future trackers





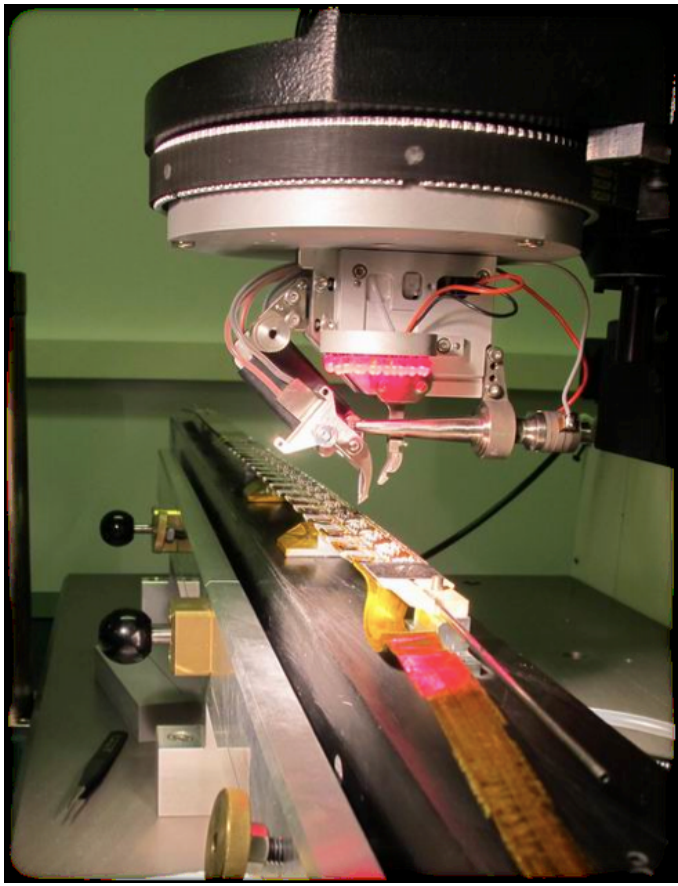
# WP4: Mechanics and Cooling

- Design of **light weight stiff composite structures** for detector support
- Qualification of materials
- Measurements of thermo-mechanical properties on support prototypes
- Design and construction of high-efficiency **CO2 cooling system**
- Common CAD software procedures for integration



# WP 5: System integration

- **Prototypes**
  - Design and construction of prototypes for the IBL detector integration – qualification of thermal and mechanical properties
- **Signal processing software**
  - Development and optimization of signal processing software
- **Integration of modules on staves**
  - Integration of modules on staves and qualification of staves
- **Integration of staves**
  - Integration of staves to the full detector system and detector commissioning
- **Overall IBL performance characterization**



# WP 6: Knowledge Exchange

- Study current **technology needs** in ATLAS
- Create map of external **R&D funding** instruments
- **Benchmark** available knowledge and technology transfer methods
- Stimulate **knowledge exchange with industrial partners**
- Business study to find **industrial applications**

# How is the training organized?

- **Researchers recruited by Partners**
  - ESRs for 36 months and ERs for 24 months
- **High quality independent research projects**
  - Each researcher is assigned to an individual research project
  - ESRs are enrolled in PhD programs within academic partners
  - Secondments from industry to academia and vice versa
  - ERs focus on leadership and management skills
  - Both S&T and complementary skill training to researchers
- **Events**
  - Network organizes workshops, summer schools, joint training courses

TALENT

# BENEFITS

# Technology transfer

- **Increases the R&D efficiency**
  - new technical solutions for future scientific infrastructures and industrial applications
- **New innovative solutions**
  - for fields such as medicine, cancer therapy, aeronautics etc.
- **TALENT R&D outcomes have market potential**
  - Outcomes of the research can be exploited outside the project as well
    - radiation sensors
    - integrated electronics
    - light-weight mechanical structures
    - CO2 cooling

# Industry-Academia cooperation

- **Enhanced knowledge exchange** between academia and industry working in the field of particle detection

- Great potential to **long-term intersectoral R&D** collaborations within the network but also with actors outside the network

# Human resources

- Combats the brain drain by offering attractive career **opportunities for young researchers in Europe**
- Trains researchers to meet the needs of today's labor market
- Creates a base of future top quality scientists in Europe


CERN


NIKHEF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Rheinische
Friedrich-Wilhelms-
Universität Bonn


SEVENTH FRAMEWORK
PROGRAMME


MARIE CURIE ACTIONS


TALENT


BERGISCHE
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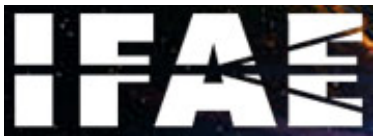
WUPPERTAL


IFAE


WU
WIRTSCHAFTS
UNIVERSITÄT
WIEN VIENNA
UNIVERSITY OF
ECONOMICS
AND BUSINESS


UNIVERSITAS OSLOENSIS
MDCCCXI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Dosimetry


cnm
Centre Nacional de Microelectrònica
IMB


ATOSTEK
Expertising your project


UNIVERSITÉ
DE GENÈVE


Fraunhofer
IZM


bgator


cividec


ADAM
Applications of Detectors and Accelerators to Medicine


CiS
Forschungsinstitut
für Mikrosensorik
und Photovoltaik GmbH


COMPOSITE DESIGN


# TALENT is recruiting NOW!

- 15 Early Stage Researchers
- 2 Experienced Researchers

- Applied Physics, Electronics, Mechanical Engineering, Software Engineering, Economics

***www.cern.ch/talent***

# Further information

**Dr. Heinz Pernegger**
TALENT Project Coordinator

CERN ATLAS Collaboration
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www.cern.ch/talent

# TALENT – expertise from 17 partners

- European Organization for Nuclear Research (CERN)
- Fraunhofer IZM
- Wirtschafts Universität Wien, Institut für Entrepreneurship und Innovation
- Foundation for fundamental Research on Matter
- Universität Bonn
- Bergische Universität Wuppertal
- CiS Forschungsinstitut für Mikrosensorik und Photovoltaik GmbH
- Atostek Oy
- Université de Genève
- University of Oslo
- IBA Dosimetry GmbH
- Institute de Fisica d'Altes Energies
- Composite Design
- Bgator
- Centro Nacional de Microelectrónica
- CIVIDEC
- A.D.A.M SA