

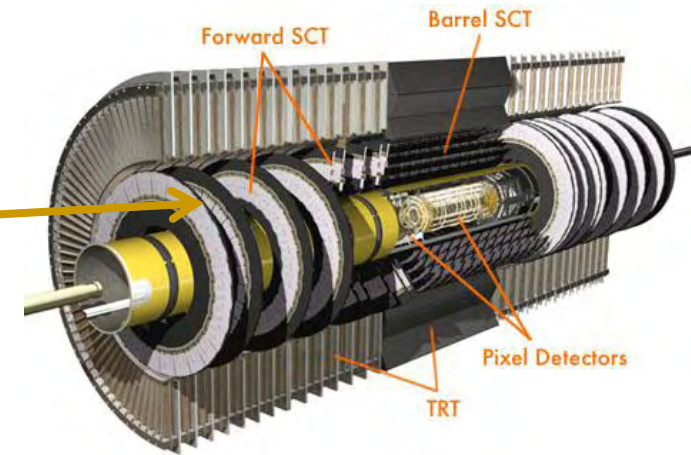
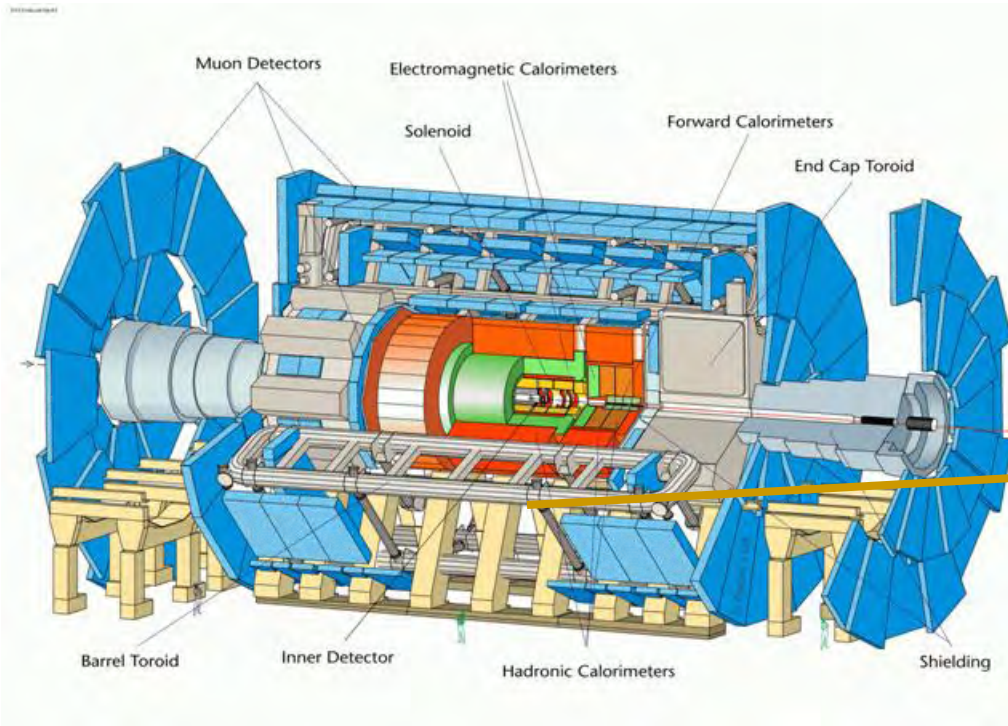
Collaboration LAL/IN2P3 & Centre de Développement des Technologies Avancées- ALGIERS

Actions et prospects

Abdenour LOUNIS

Collaboration in High Energy Physics and advanced technologies

- We have started to discuss a contribution on the design simulation and characterization of ATLAS planar pixel planar for SLHC

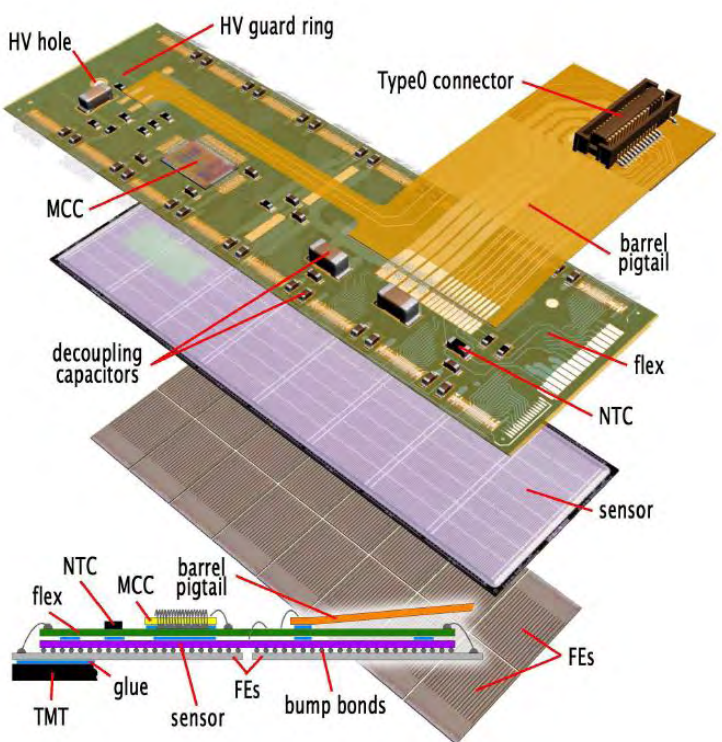
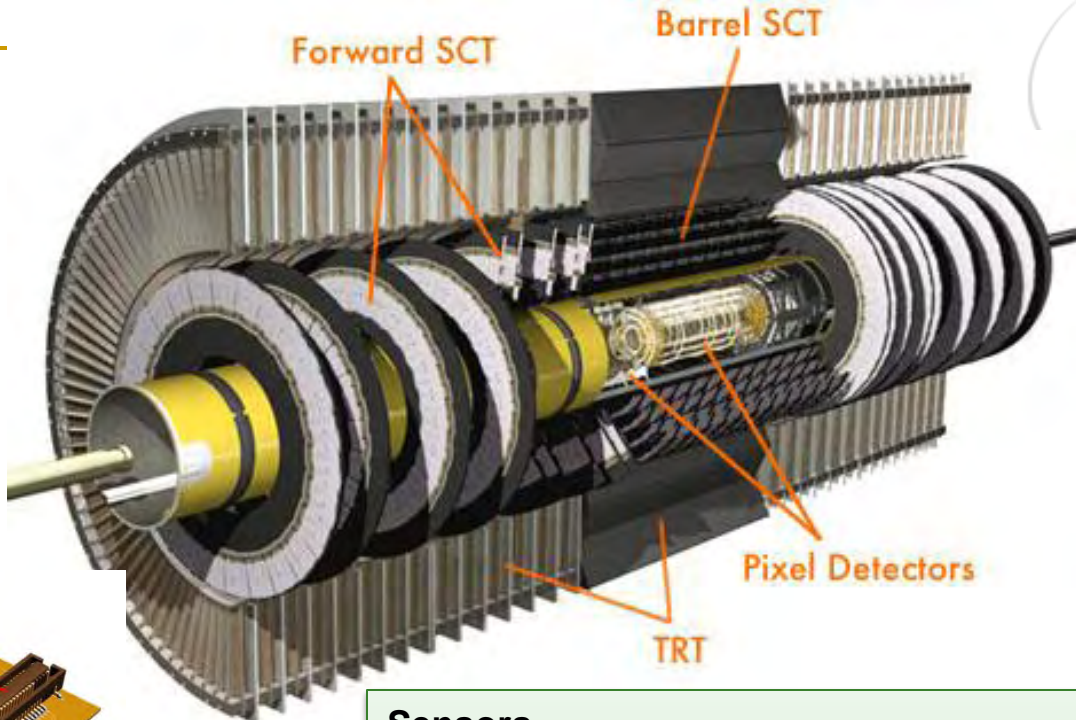


Zoom of Inner Tracker

ATLAS detector



Pixel Detector



Sensors

- n-doped bulk on a p⁺ backplane with n⁺ pixels
- Typical pixel dimensions: 50 μm × 400 μm
- Bulk depth: 250 μm
- Radiation-hard to 50 MRad

16 Front-end (FE) chips

- Bump-bonded to the pixels
- 0.25 μm CMOS technology
- Analog pre-amplification, discrimination, time-over-threshold (TOT) measurement, and digitization



مركز تنمية التكنولوجيات المتقدمة


CDTA : Centre de Développement des Technologies Avancées
Centre of the Advanced Technologies Development

300 persons ; 50% researchers

→ Area of expertise :

- Architecture of systems and multimedia
- Robotics
- Ionized medium and lasers
- Microelectronics and et Nanotechnology

CDTA
BP.17 Baba Hassen, 16303 Alger, Algérie.
www.cdta.dz

- 
- Sensor simulation
(common software tools)
 - Systems on chips
 - FPGA
 - VLSI ASIC development

R&D Activities example :

This activity is summarized in the following

- ⇒ Electrical characterization of component and semiconductor devices
- ⇒ Study the effect of degradation on MOS structures by ionizing particles and their electrical stress
- ⇒ Physics and simulation of the device technology and et numerical model of electrical characteristics of various types of silicon devices.

Examples:

- ☞ Characterization of radiation effects γ on oxide SiO_2 and the Interface, Si/SiO_2 of MOS devices.
- ☞ Development of methods of electrical parameter extraction qualifying the degradation of irradiated transistors by CV, IV, measurements.
- ☞ Simulation of the CMOS $1\mu\text{m}$ technological process for the integration of compatible components



ACTIONS

2007 : The Algerian Minister of Higher Education and Scientific Research, Rachid Haraoubia, visited CERN on 14 November. His party included the Rector of the University of Blida and the Director of the Algerian Ecole Nationale Polytechnique. Welcomed by CERN's Director-General, Robert Aymar, and Secretary-General, Maximilien Metzger, he signed the VIP Visitors' Book before going on to visit the ATLAS experiment and the LHC tunnel. He then had the opportunity to meet Algerian scientists working at CERN.

Some fifteen Algerian physicists attached to European and US institutes are participating in the LHC experiments, in particular ATLAS. A formal collaboration agreement between Algeria and CERN is expected to be drawn up in the near future.



Seminar on January 2008

Avancées Technologiques auprès du LHC au CERN de Genève

Visit of CDTA scientists to LAL and CERN - meet Atlas & LAL Management

- Definition of area of cooperation in ASIC development and sensor characterization
- Cooperation in terms of exchange of expertise (device simulation and sensor characterization)
- Mutual usage of technical infrastructure (clean rooms)
- Provide technical skills for scientist and engineers
- Establish in the future a cooperation in terms of Phd student exchanges

Summary : Program of de contributions to ATLAS SLHC

Goal :

- Contribution in detector or sensor testing for Atlas Pixel Tracker
- Understanding the physics of irradiation damage of silicon sensors at LHC
- Participation in the design of the pixel front end electronics (transfer of knowledge on CMOS submicron technology)
- Launch a program of co supervision of Phd Thesis in High Energy Physics between LAL-CERN and CDTA