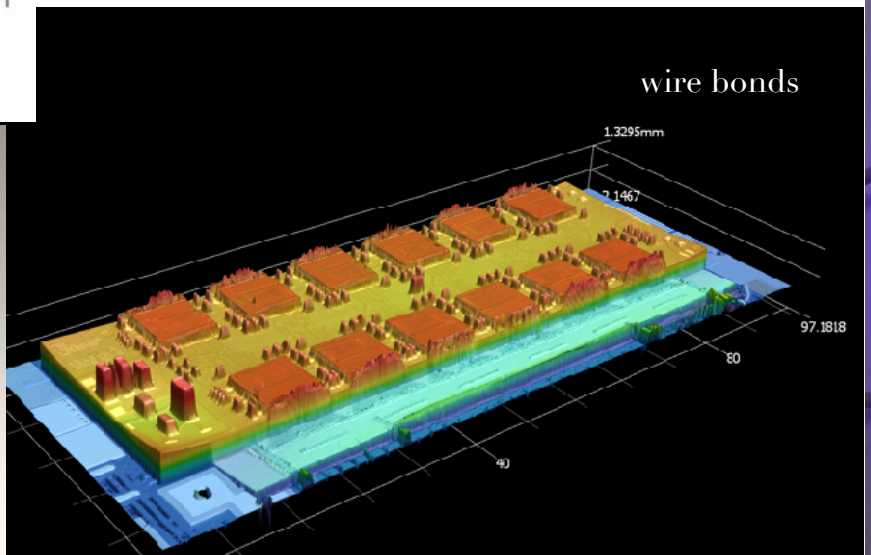
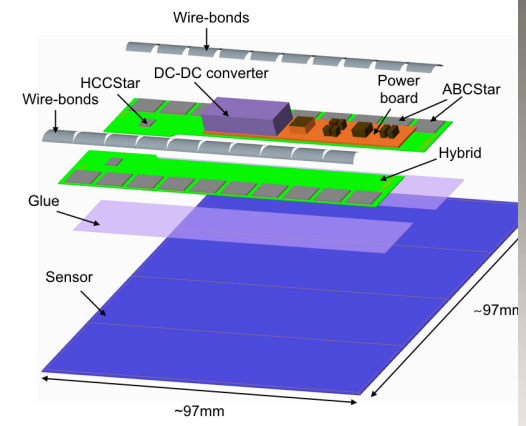
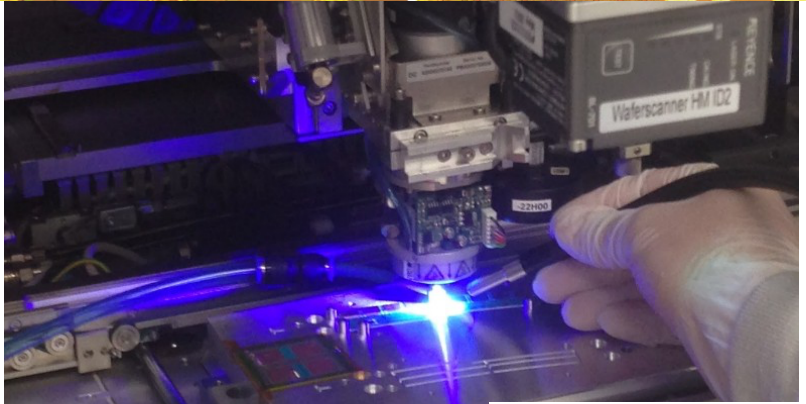


# ATLAS-Canada Inner Tracker Phase II Upgrades at CERN

Richard Teuscher IPP / Toronto



# Brief CV



- RT hired by IPP in 2005, academic appointment at Toronto  
2018- : Principal Research Scientist / Full Professor  
2009-2018: Continuing Research Scientist / Associate Professor
- Previously on OPAL at LEP (1997-2001) and ZEUS at HERA (1989-1996)
- 100% ATLAS 2001-present, based at CERN:
  - 2018- : ATLAS inner tracker (ITk) upgrade Overall Electronics coordinator, ITk Restricted Steering committee, ITk Online DAQ Chair (2024-)
  - 2014-2017: ATLAS ITk upgrade ASIC coordinator, Canadian ITk National Contact
  - 2013-2015: ATLAS Canada Deputy Spokesperson
  - 2011-2015: ATLAS Editorial Boards: H-> WW, H ->ZZ, Jet/Etmiss
  - 2009-2011: Co-Convener, ATLAS Jets and Missing ET
  - 2008-2009: ATLAS Data Preparation Coordinator, Jets and Missing ET
  - 2005-2008: Tile Calorimeter Phase 3 Commissioning Coordinator
  - 2006-2007: ATLAS Counting Room Management (team of 4 physicists)
  - 2006-2008: LAr calorimeter Electronics Radiation Hardness Coord.
  - 2004-2008: ATLAS Technical Management Board (TMB)
  - 2001-2006: TileCal Electronics Radiation Hardness Coordinator

+ Jan 2018: Appointed by CERN DG to represent Canada/US/Americas on Advisory Committee of CERN Users (ACCU)

+ 2023- Representative for Canada, ICFA (International Committee for Future Accelerators", (2023-).

## Outreach Activities

- (i) Continued visits to CERN (VIP/students/collaborators/public)
- (ii) Negotiated contribution to IPP CERN student program w. McMaster (\$25k), 2022
- (iii) Initiated contact in 2024 between IPPOG (International Particle Physics Outreach Group) and Canadian outreach stakeholders, together with M. Diamond, SNOLAB, PI, TRIUMF.; met with IPPOG Director at ICHEP'24, TRIUMF signed in 2026

# IPP RS Training of Highly Qualified Personnel



- Current Ph.D. students:
  - 2026-present, Brianna Binoy, Ph.D. student 2026-, ATLAS ITk
  - 2024-present, Evan Whitlock, M.Sc. 24-25, PhD student 2025-, U. Toronto, **quantum entanglement with top quarks**, ITk silicon microstrip module production & testing.
  - 2025-present, Jason Kahn, PhD student University of Toronto, **H→ZZ** with ATLAS, ITk
- Ph.D.'s Graduated:
  - 2018-2025, Timothy Knight, Ph.D. student, University of Toronto, "Search for **Dark Matter** with ATLAS and ITk Upgrade".
  - 2018-2024, Tae Hyoun Park, Ph.D. March 2024, University of Toronto, "Measurements of **Higgs Couplings** in the WW channel and the ITk Upgrade for ATLAS". Now postdoc at Max Planck Institute, Munich, Germany
  - 2015-2020: Abidi, Syed Haider, "Precision Coupling Measurements of the Higgs Boson using the **H → ZZ\* → 4l** decay channel", Ph.D. thesis, University of Toronto (12 May 2020). NSERC Alexander Graham Bell Canada Scholarship 2016-2019, NSERC 2015-16. Now scientist on ATLAS at Brookhaven National Laboratory (BNL), USA.
  - 2013-2015, Kyle Cormier, Ph.D. student, University of Toronto, ITk TID and SEE tests, **top quark polarization**, now CERN Fellow.
  - 2013-2015, Laurelle Veloce, Ph.D. student, University of Toronto, ITk module building, **H→ZZ**, now CFI scientist @ Toronto on ITk.
  - 2009-2015: Ilic, Nikolina, Ph.D., ATLAS **Higgs→WW** studies with ATLAS, LAr run coordinator, awarded Alexander Graham Bell Graduate Scholarship, 2009-2015. Formerly RA at Stanford, USA, then faculty at Nijmegen NL, now IPP RS (hired 2018).
  - 2008-2012: Bain, Travis, Ph.D., University of Toronto, "A Search for **Supersymmetry** with new Kinematic Variables with ATLAS", (2012), Assistant Prof at Haverford PA, formerly Frontiers of Science Fellow, Columbia University, USA.
- Current Postdoc: Andrea Gabrielli, RA, University of Toronto, ATLAS FELIX readout for ITk (2021-).
- Undergraduate students: 2026 (summer) Adib Afnan, Gillian Nestor, **H→ZZ** with ATLAS
- Supervised 9 postdoctoral fellows, 3 engineers/technicians, 20 Ph.D. students, 3 M.Sc. students, 34 undergraduates.

# Physics - Recent publications

1. ATLAS Collaboration, “Measurements of Higgs boson production via gluon-gluon fusion and vector-boson fusion using  $H \rightarrow WW^* \rightarrow \ell\nu\ell\nu$  decays in pp collisions with the ATLAS detector and their effective field theory interpretations”, Eur.Phys. J C85 (2025) 1403.
2. ATLAS Collaboration, “Interpretations of the measurements of Higgs boson production and decay rates and differential cross-sections”, in preparation (2023) (Primary supervisor).
3. ATLAS Collaboration, “Test of CP-invariance of the Higgs boson in vector-boson fusion production and its decay into four leptons”, submitted to JHEP (2023) (Primary supervisor).
4. ATLAS Collaboration, “Evidence of off-shell Higgs boson production from ZZ leptonic decay channels and constraints on its total width with the ATLAS detector”, submitted to Phys.Lett. B (2023) (Primary supervisor).
5. ATLAS Collaboration, "Measurements of Higgs boson production by gluon-gluon fusion and vector-boson fusion using  $H \rightarrow WW^* \rightarrow e\nu\mu\nu$  decays in  $p p$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector” (Phys.Rev.D 108 (2023), primary supervisor).
6. ATLAS Collaboration, “Measurements of the Higgs boson inclusive and differential fiducial cross sections in the 4l decay channel at  $\sqrt{s} = 13$  TeV”, Eur.Phys.J C 80 (2020) (Primary supervisor).
7. ATLAS Collaboration, “Higgs boson production cross section measurements and their EFT interpretation in the 4l decay channel at  $\sqrt{s} = 13$  TeV with the ATLAS detector” (European Phys. J. C 80, 2020) (Primary supervisor).

## •External Reviewer for Publications:

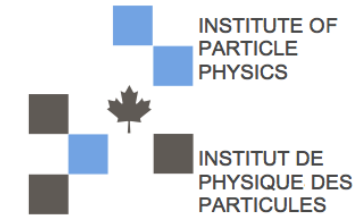
1. R. Teuscher, editor for W.Ashmanskas et al, The AMACStar ASIC for the HL-LHC ATLAS ITk Strip Detector: Design, Verification, and Quality Assurance”, accepted by JINST, August 2025.

→ 1992-now approx. >1300 papers total: 1067 ATLAS, 215 OPAL, 85 ZEUS. Avg. 150 citations / paper, h-index: 200

## Talks

- 2026/04 - “Subatomic Physics in Canada”, ICFA, April 2026, CERN (10 minutes).
- 2025/08 - “The Canadian Subatomic Physics Community Submission to the European Particle Physics Strategy Update”, ICFA, Lepton-Photon 2025, Madison, Wisconsin USA, August 2025 (10 minutes).
- 2025/06 - “WG1: INTERNATIONAL COMMITTEE FOR FUTURE ACCELERATORS (ICFA)”, Canadian National IUPAP Liaison Committee (CNILC), June 11, 2025 (10 minutes).
- 2023/07 - “The Canadian Subatomic Physics Landscape”, on behalf of NSERC-funded subatomic physics investigators in Canada, Physics in Collision (PIC22), ICFA July 2023 (Invited talk).
- 2023 - “ITk Common Electronics”, series of talks at CERN on ATLAS Inner Tracker (ITk) Upgrade.
- 2022/09 - “Review of the Higgs Quantum Numbers (mass, spin, CP)”, on behalf of the ATLAS and CMS collaborations, Physics in Collision (PIC22), Tbilisi, Georgia, September 5, 2022 (Invited Plenary talk).
- 2021/06 - “ATLAS Upgrades”, 9th Edition of the Large Hadron Collider Physics Conference, LHCP 2021, Paris, virtual, June 11, 2021 (Invited Plenary talk).

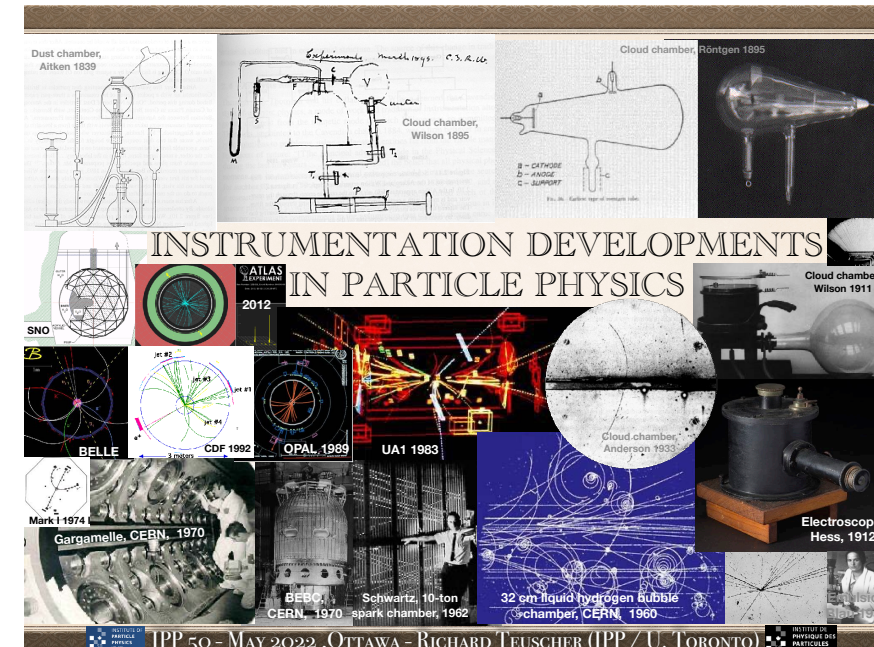
- 2 Search for dark matter in events with a vector boson and missing transverse momentum using  $140 \text{ fb}^{-1}$  of proton-proton collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector
- 3
- 4
- 5



IPP Brief to the 2025-2026 Long Range Planning Committee

IPP Council, M. Danninger, R. Gornea, C. Krauss, M. Swiatlowski, R. Teuscher, A. Vincent, Y. Zhang

December 1, 2025

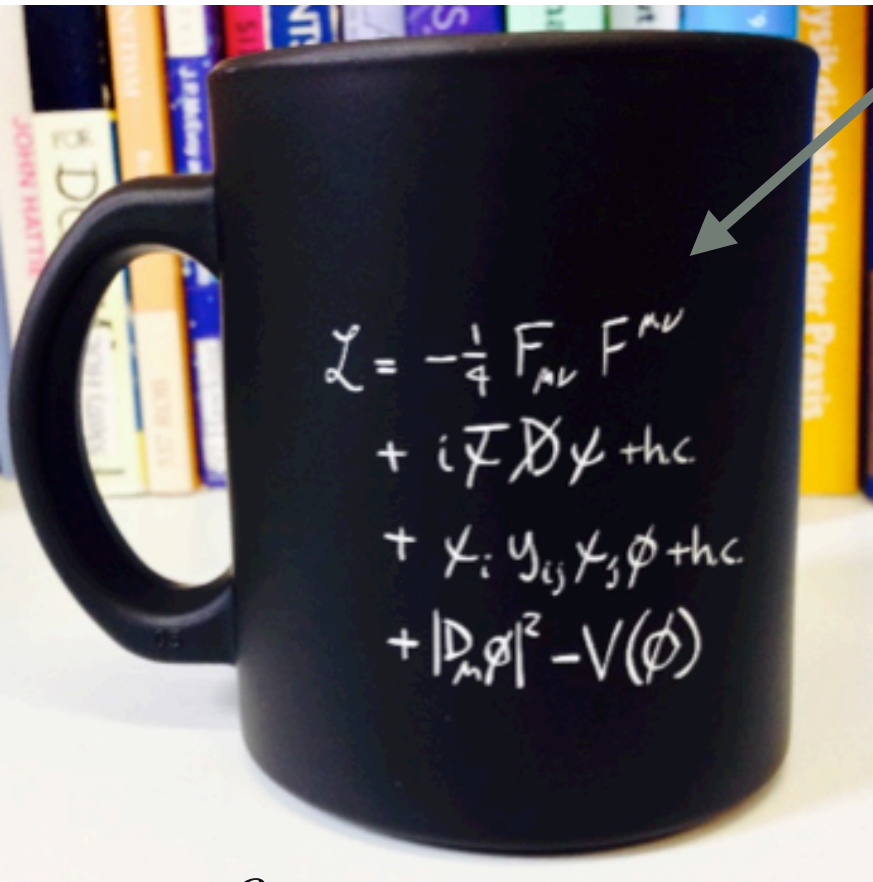


$H^0$

# The LHC so far (just 10% of data)

Mass  $m = 125.25 \pm 0.17$  GeV

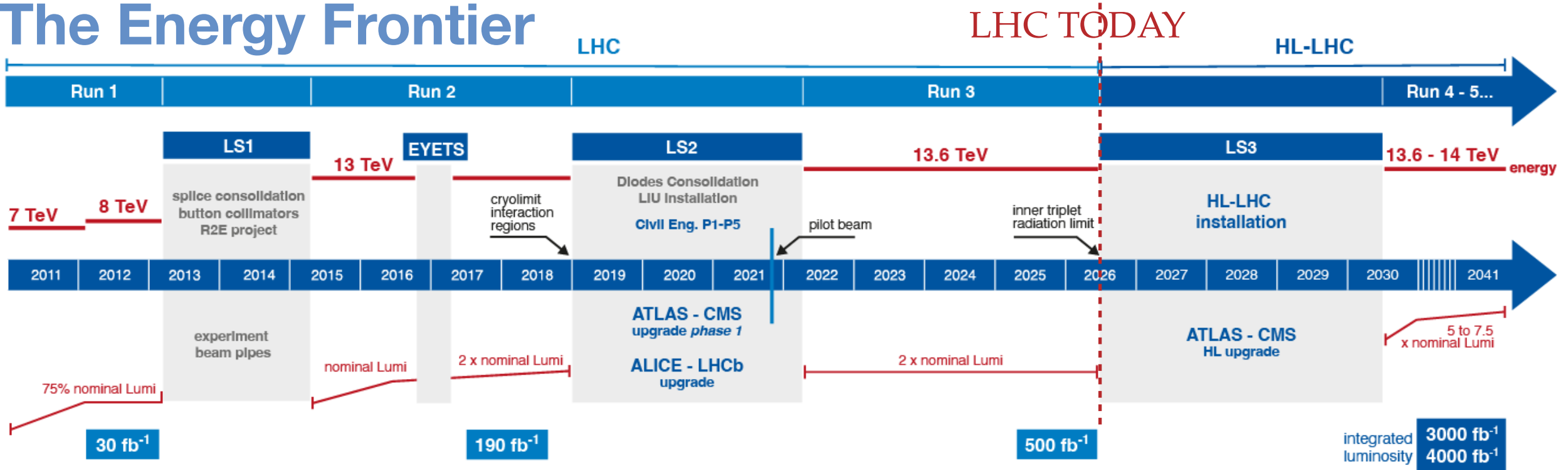
Full width  $\Gamma = 3.2^{+2.8}_{-2.2}$  MeV



- Success of the **Standard Model**: Higgs field  $\phi$ 
  - + Electroweak symmetry (electricity and magnetism)
  - + Quantum Chromodynamics (strong force = QCD)
- Open Problems:
  - Why is the Higgs mass 125 GeV and not at the Planck scale?
  - What is the origin of matter-antimatter asymmetry in the universe?
  - What is the nature of Dark Matter? Dark Energy?
  - How to explain neutrino masses?
  - How to fit in gravity?
- Could there be new physics at a larger energy scale ( $\Lambda$ )?  $\rightarrow$  LHC

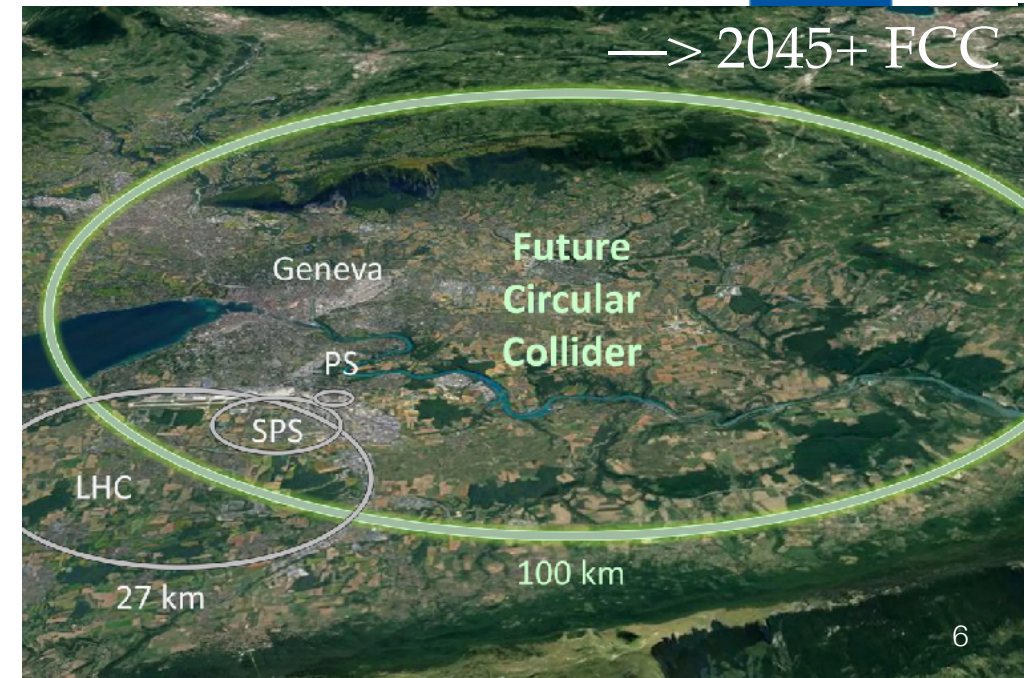
$$+\frac{c_{ij}}{\Lambda} L_i L_j + \Lambda^4?$$

# The Energy Frontier

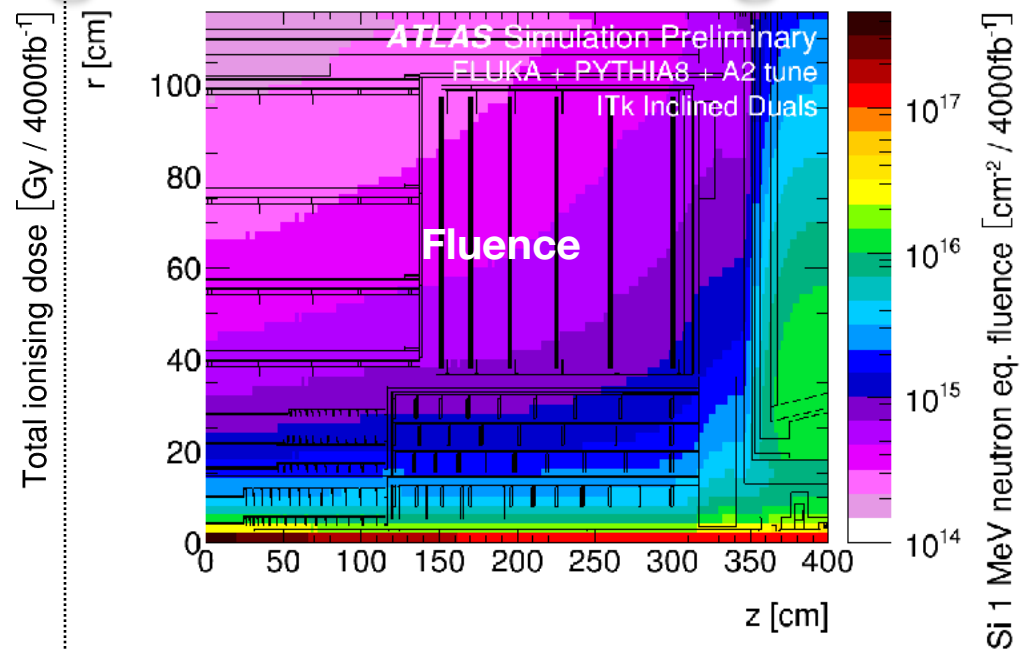
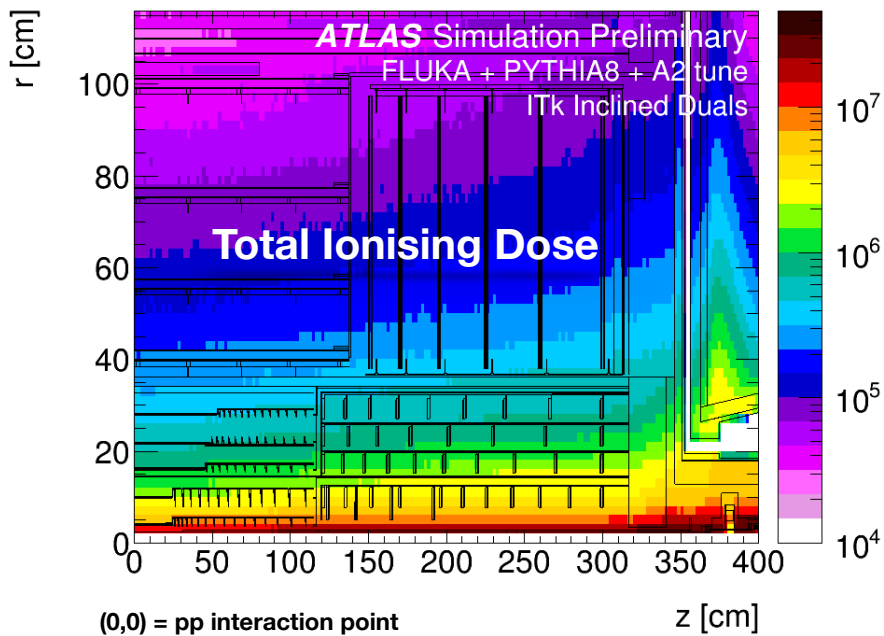


- TODAY: Continue to analyze Run 2 + new R3 data set at 13 TeV
- Run 3 data at 13.6 TeV, doubling existing data set
- *Near horizon*: **High-Luminosity LHC (HL-LHC)** 10 x data
- *Long term prospects*: proposed Future Circular Collider (FCC) new 100 km tunnel, Higgs factory: 2 million Higgs events...

Richard Teuscher / IPP / June 2026

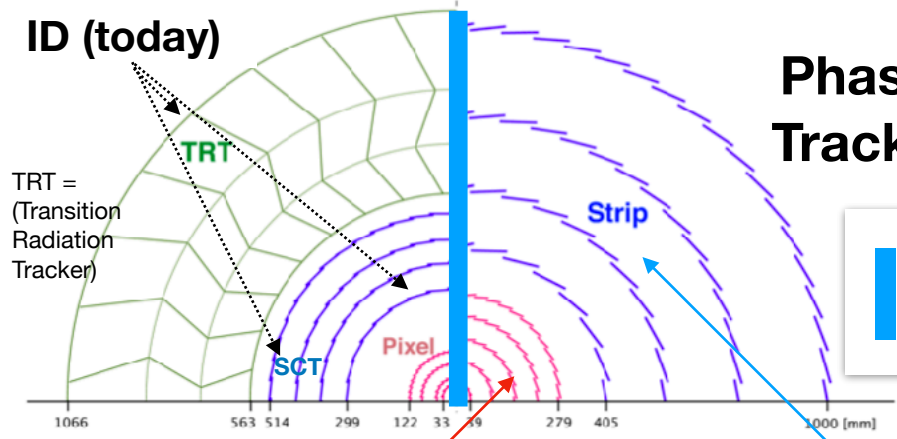


# HL-LHC Challenge: Radiation Damage



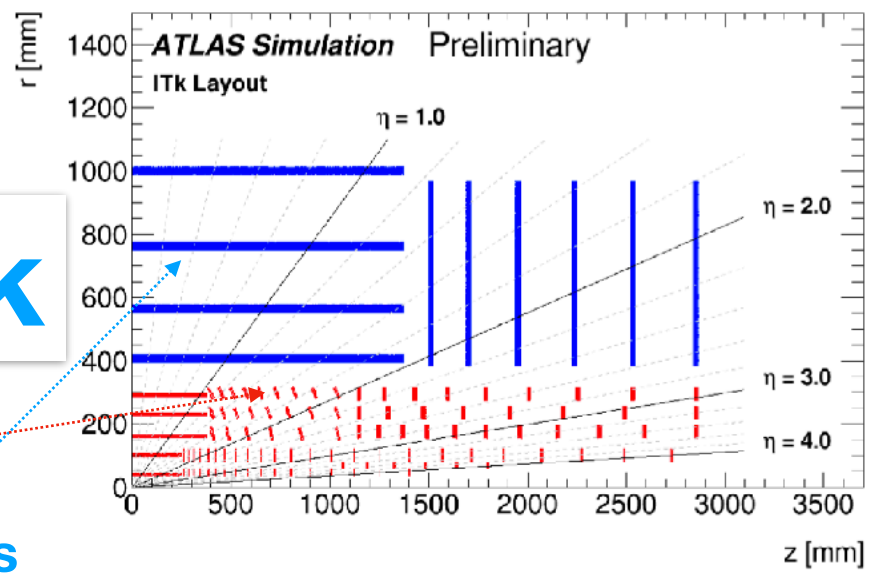
The inner **tracker** | (ITk) must continue to perform at the High-Luminosity LHC (HL-LHC) up to 4000 fb<sup>-1</sup> (except Pixel IS replaced @ 2000 fb<sup>-1</sup>):

- **Detector Sensor technologies** (Si planar, 3D, diamond) qualified for: (3-19x10<sup>15</sup> n<sub>eq</sub>/cm<sup>2</sup>, 2-10 MGy)
  - NIEL (Non-Ionizing Energy Loss)
    - > bulk damage (trapping centres), depletion voltage and leakage current increase
- **Front-End Readout ASICs** (Application Specific Integrated Circuits) qualified for:
  - TID (Total Ionising Dose) —> surface effects, transistor damage and ageing effects
  - SEE (Single Event Effects) induced by heavy ions and hadrons —> either soft errors (no permanent damage: Single Event Upsets,...) or hard errors (permanent damage: Single Event Latchup)
- **Material (cable, glue, composite...) must be qualified**
  - TID can compromise chemical/mechanical integrity



## Phase 2 Tracking

**ITk**



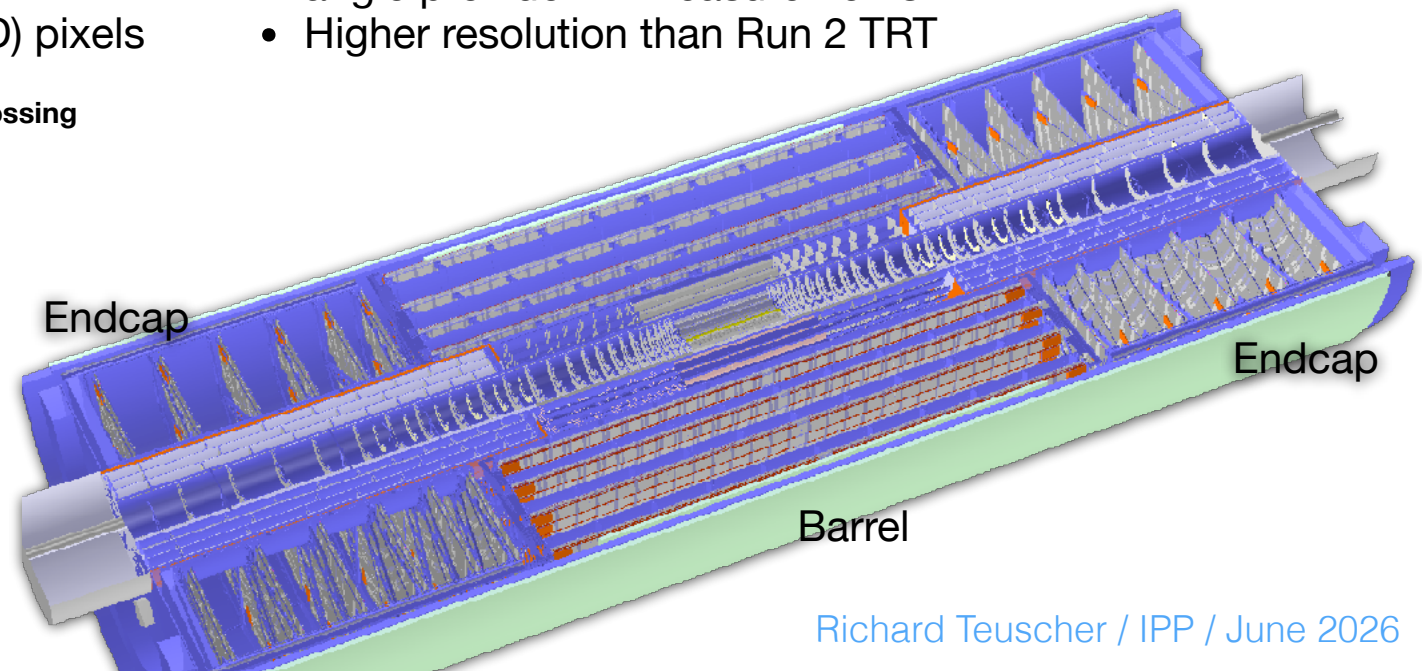
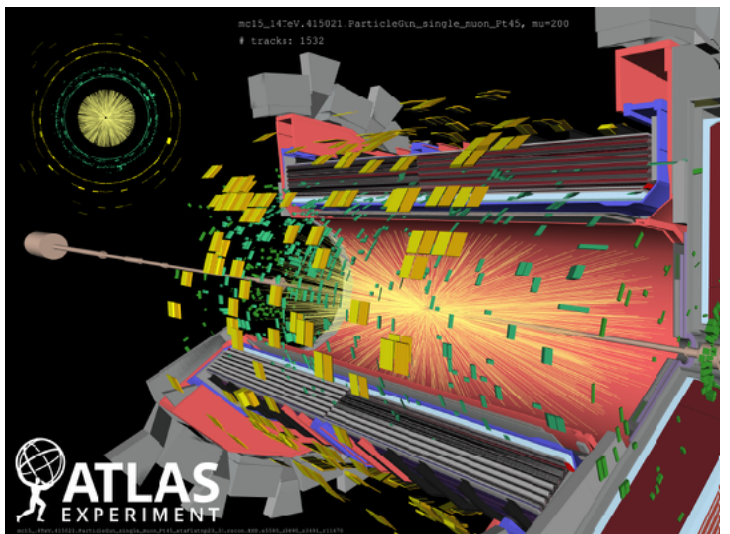
### ITk Pixels

- 5 barrel layers + 5 EC (EndCap)
- Inclined sensors
- Covers  $|\eta| < 4$  (was 2.5)
- 1st layer 35 mm from beam line
- Higher resolution than Inner Detector (ID) pixels

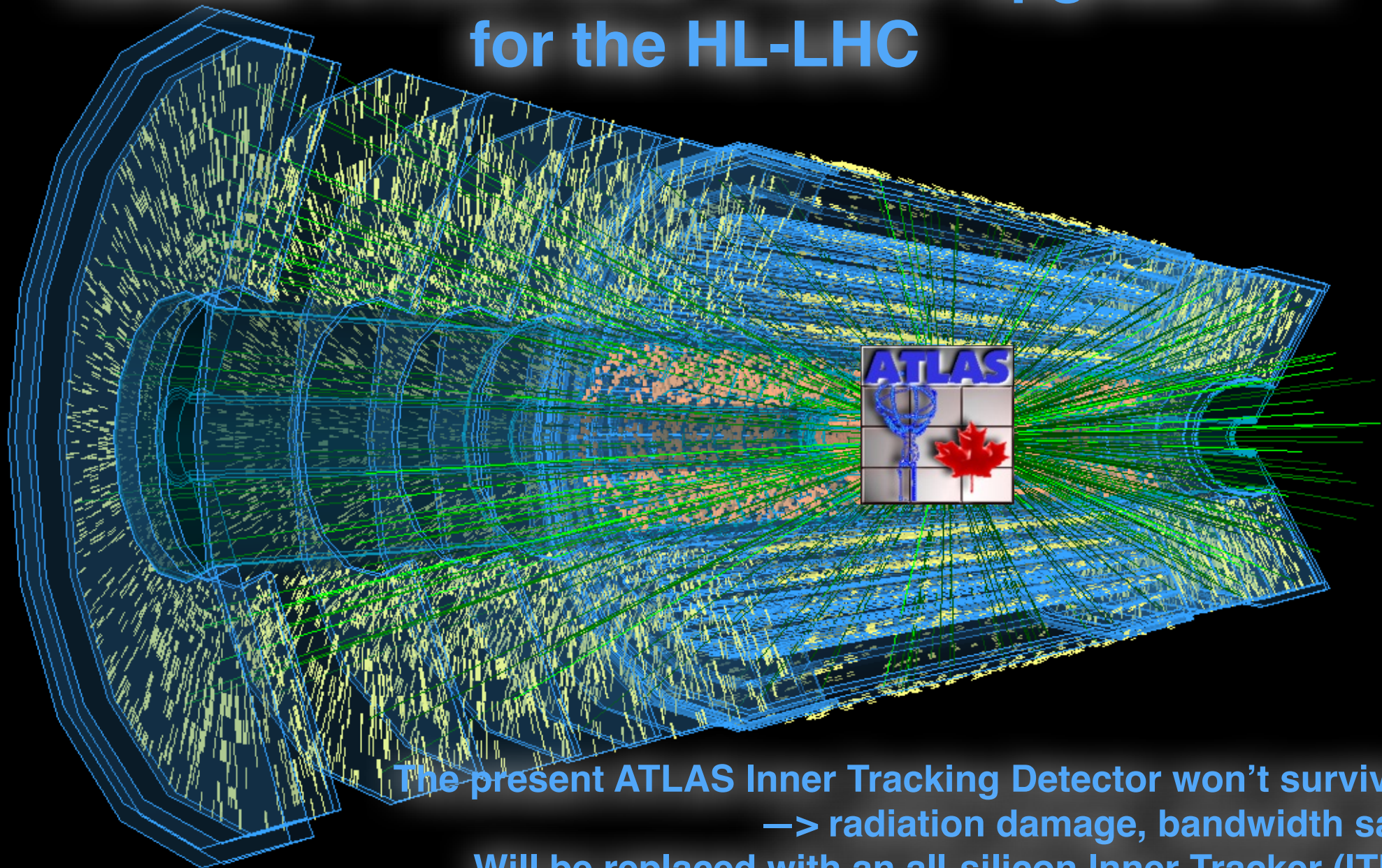
### ITk Strips

- 4 barrel layers + 6 EC (Endcap) rings
- Silicon microstrip modules with small stereo angle provide 2D measurements
- Higher resolution than Run 2 TRT

High-Luminosity LHC (HL-LHC) 200 interactions/bunch crossing

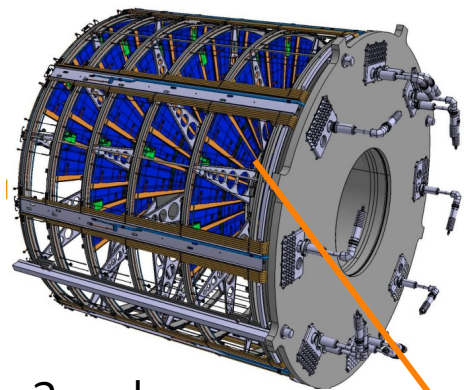


# Canada: ATLAS Inner Tracker Upgrade ITk for the HL-LHC

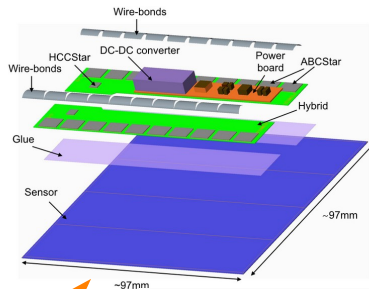
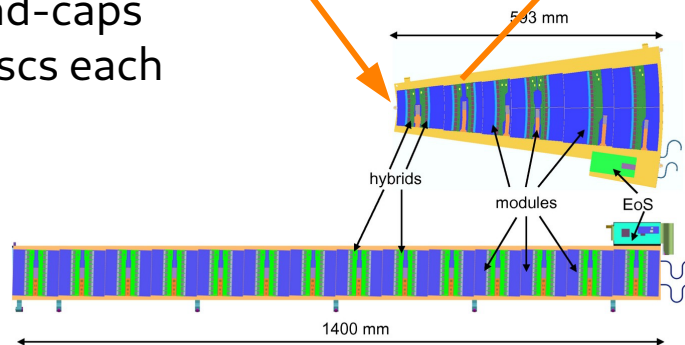


The present ATLAS Inner Tracking Detector won't survive HL-LHC:  
—> radiation damage, bandwidth saturation...

Will be replaced with an all-silicon Inner Tracker (ITk): pixels +  
silicon microstrips, total area of 200 m\*\*2



2 end-caps  
6 discs each



6 end-cap module types  
4608 modules total  
(1/4 built in Canada)



# ATLAS Canada Tracker Upgrade Installation in LS3

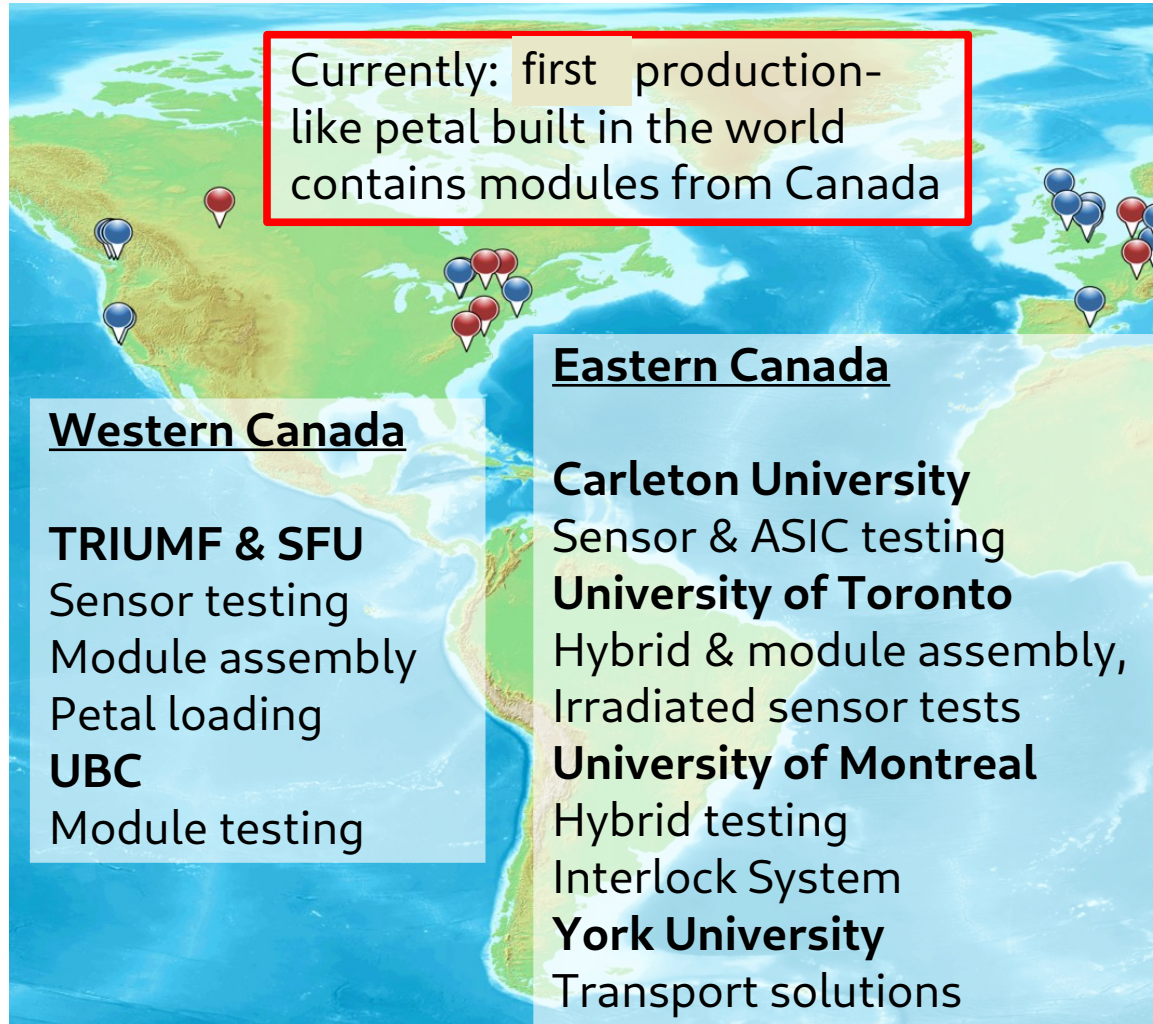
Currently: first production-like petal built in the world contains modules from Canada

Half of all the end-cap sensors world-wide are tested in Canada

Every module assembly site worldwide is using readout chips probed in Ottawa

Majority of sites currently building modules use hybrids assembled in Toronto

The first production-like petals in the world were assembled in Vancouver



ATLAS Canada: Inner Tracker Upgrade (ITk) Silicon Microstrips Endcap (also LAr calo, muons)

Together with industrial partners in Canada DA-Integrated (wafer dicing) & Celestica (34B\$ company, ITk PCB and module production)

# Support for ITk

- **NSERC RTI  
2016-2017 \$188k  
(total \$220k)**

- **NSERC RTI  
2017-2018 \$127k  
(total \$193k)**

- + OCE (Orr, Teuscher)  
2014-2015 \$40k  
CFI JELF 2016 (Stelzer)  
\$500k

*(by Project / par projet)*

Project Title / Titre du projet	Institution / Établissement	Maximum CFI Contribution / Contribution maximale de la FCI
Upgrades to the ATLAS Detector at the Large Hadron Collider	Administrative / Administrateur University of Toronto	\$9,200,000
	Collaborating / Partenaire Carleton University	\$800,000
	McGill University	\$3,000,000
	Simon Fraser University	\$5,000,000
	The University of British Columbia	\$4,800,000
	Université de Montréal	\$1,754,533
	University of Alberta	1,500,000
	University of Victoria	\$2,800,000
York University	\$900,000	

**\$29,754,533**

***Successful track record of significant NSERC support (2\*RTI + ATLAS Canada operating grant) built strong foundation for CFI award & ensured that Canada will continue to play a leading role in the future.***



# Canadian Industry & CERN

IPP RS pioneered first contact w. Celestica

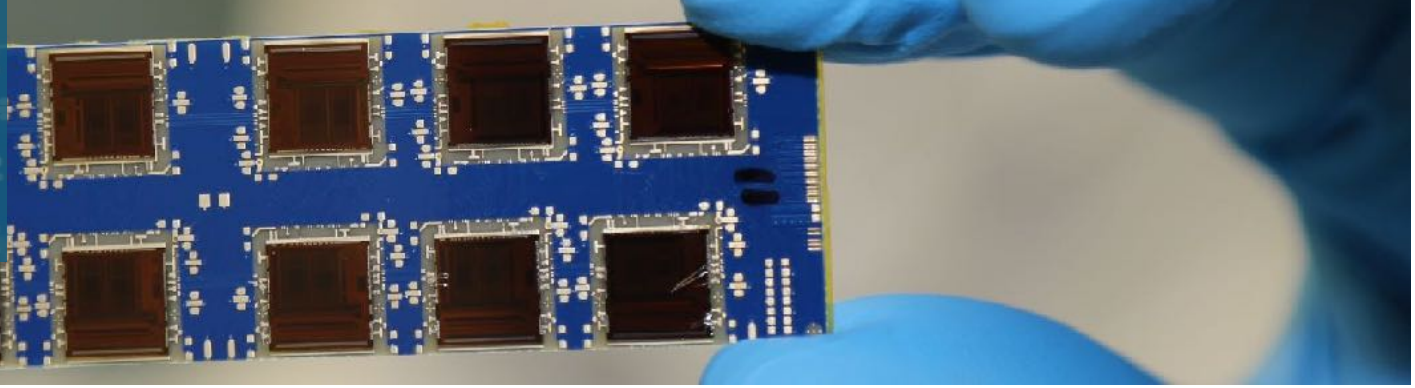


- Celestica: Multinational electronics manufacturing services (EMS) company, former IBM
- 35,000 employees worldwide, annual revenue 34B\$
- Headquarters in Canada (Toronto)
- Computing, communications, aerospace and defence, consumer, industrial, automotive elec.
- Blackberry, Kobo reader, X-box controller, ...
- Management and engineering strongly interested in working on ATLAS/CERN Upgrade project
- R&D oriented: opened their new \$1M microelectronics lab to Canadian grad students, undergrads, postdocs, and faculty...



# Microelectronics Collaboration with CERN

## A Case Study



### Customer Challenge



- CERN needs to build a new tracker for the Atlas II upgrade Hadron Collider.
- Taking lab processes and transforming them to scalable production solutions

### Unlocking Potential

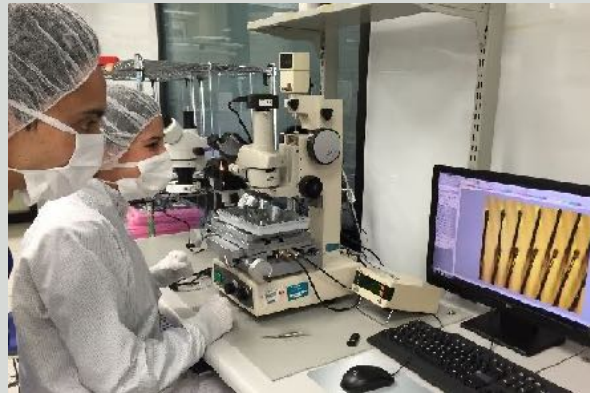


- Toronto (Canada) now part of the countries (UK, USA, Germany) to provide silicon strip modules to help meet the demand requirement. (Celestica builds 1000 sensors by 2021)
- Celestica and UoT have automated steps of the process to achieve the production targets with accuracy and repeatability.

### Celestica Solution



- Celestica and University of Toronto partner together for process development and production
- Celestica provides die attach and wirebonding processes
- Celestica automates die attach processes currently being assembled manually with fixturing.



Wirebonding of Hybrid to Sensor

*Celestica now using ATLAS Canada / ITk CERN project as a case study for successful collaboration*

Date June 6, 2016

Dr Thomas Koffas  
Department of Physics  
Carleton University  
Ottawa, Canada

DA-Integrated and Celestica collaborated successfully in the past on the Blackberry

Dear Dr Koffas

Thank you again for interesting discussion on the ATLAS ITk project. The Atlas ITk project is a key project within the Large Hadron Collider (LHC) upgrade to be completed in the 2024 timeframe. The silicon microstrip sensor, ABCStar ASIC, and related assemblies are key technology components of the project. DA-Integrated would like to support the project though collaboration with participating Canadian and international researchers.

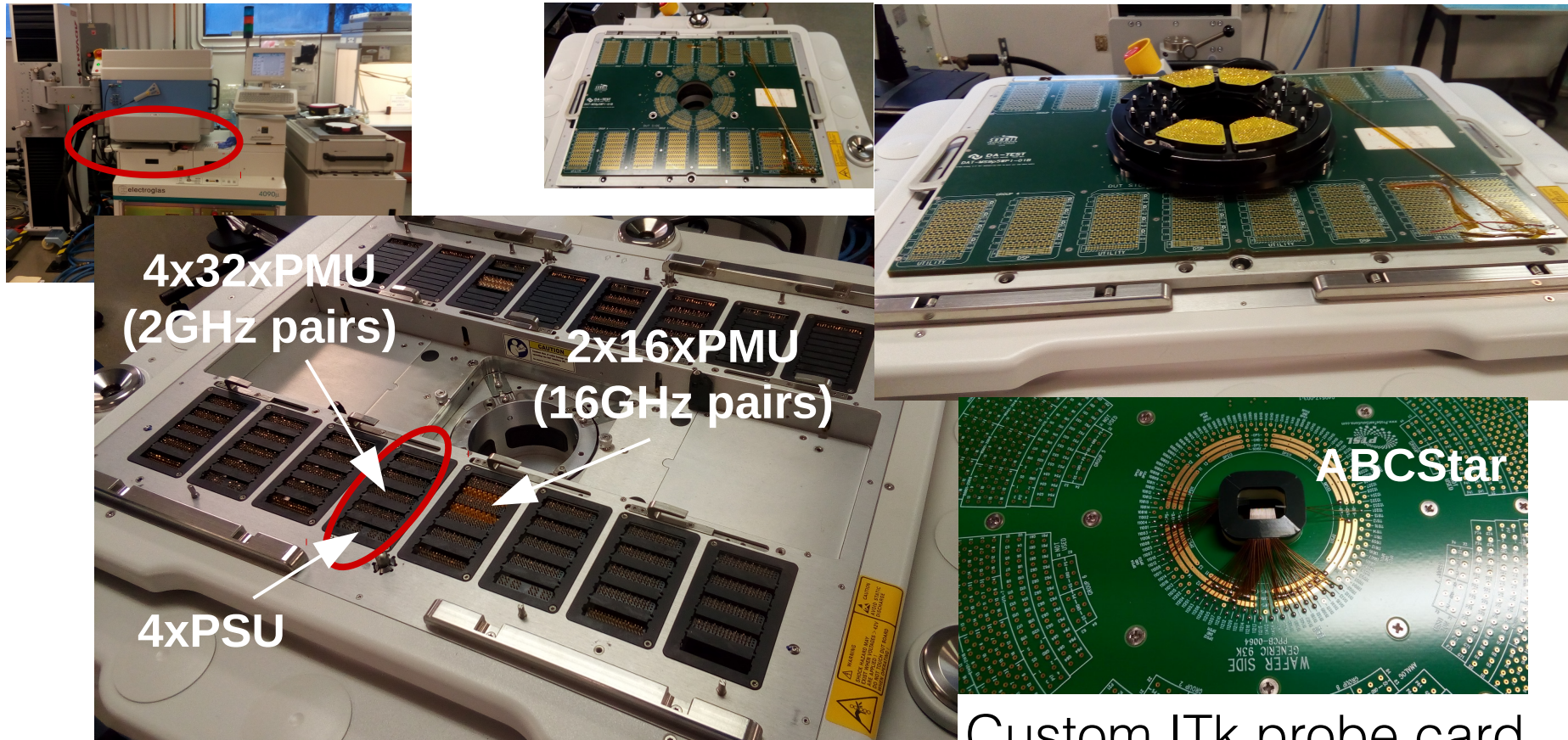
DA-Integrated is a microelectronics service provider specializing in standard and custom test solutions for custom integrated circuit (ASIC) and multi-technology modules. Our high capacity ATE (automated



test equipment), wafer probe, and package handlers provide prototyping and volume production in our 24/7 production facility in Ottawa. Our test services are complemented by ASIC design and supply management capability which when combined with our test expertise bring a full set of ASIC services to our customers.

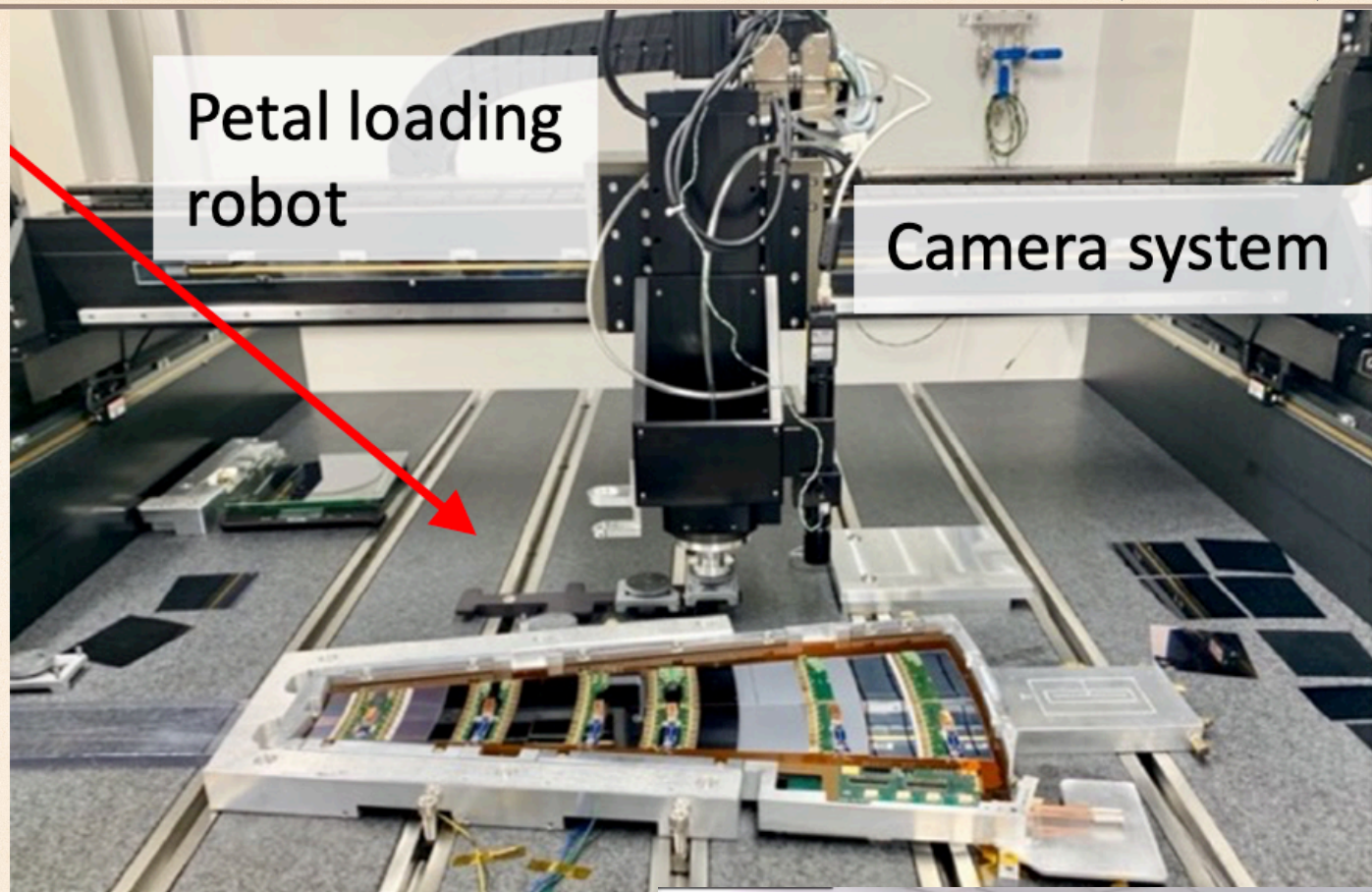
DA-Integrated was founded in 2002 and has completed more than 500 projects for over 100 customers including multi-national companies, startups, and research organizations.

# ASIC Wafer Probing and Dicing in Canadian Industry



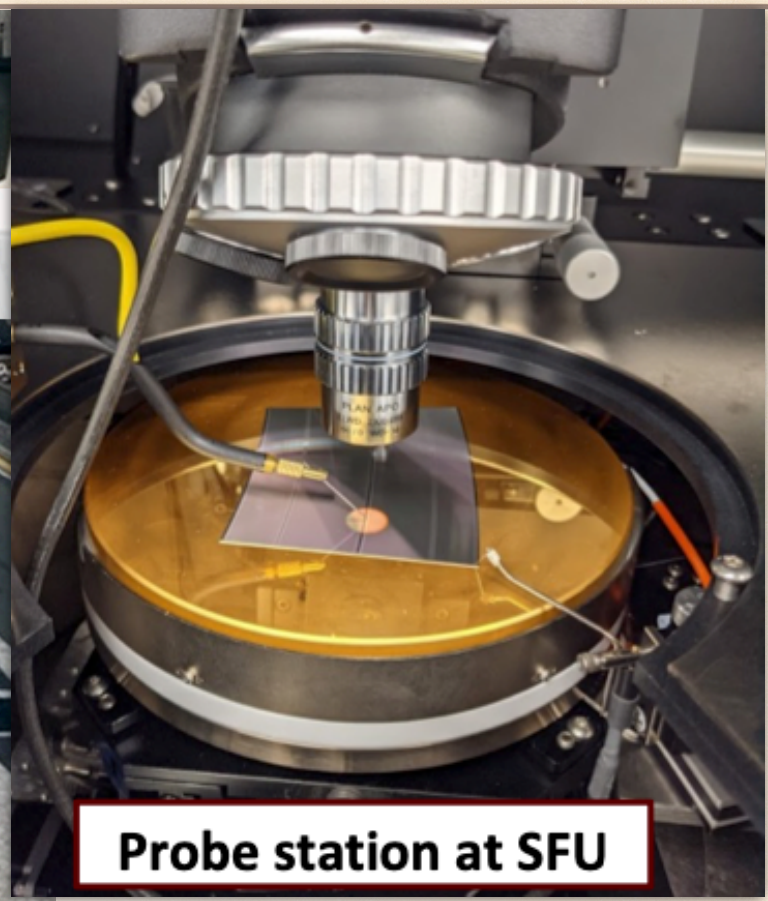
PMU = Parametric Measurement Units

Close to Carleton - group members embedded in industry - accessible - rare in industry used to customarily large volumes 1000's wafers



Petal loading robot

Camera system



Probe station at SFU

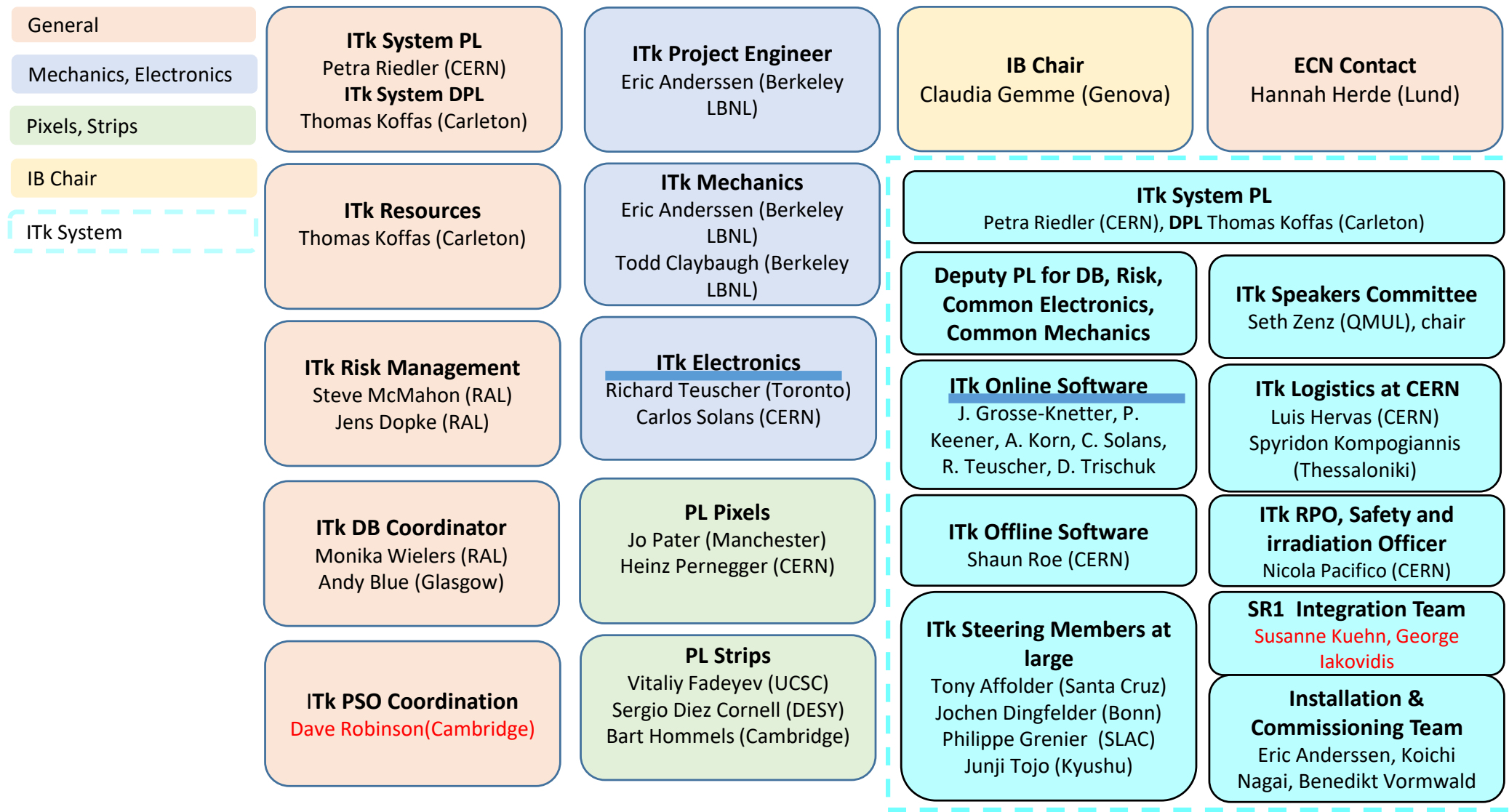


UBC clean room



Cleanroom at TRIUMF

INNOVATION.CA  
CANADA FOUNDATION FOR INNOVATION / FONDATION CANADIENNE POUR L'INNOVATION



# ITk Electronics Coordinator - IPP RS

- 2.4.1 Environmental Monitoring
  - 2.4.1.1 Temperature
  - 2.4.1.2 Relative Humidity
  - 2.4.1.4 Radiation
- 2.4.2 Interlock System
- 2.4.3 Grounding & Shielding
- 2.4.4 Luminosity and Beam Protection System
- 2.4.5 Phase I FELIX Readout for ITk
- 2.4.7 Pixel Luminosity Rings
- 2.3.1 Outer Cylinder Heaters
- 2.5.3 ITk Online Software

## MoU Item: 2.4.2 Interlock and Protection System

**Description:** The ITk interlock system is a mission-critical hardware safety system that provides the last line of defense against system failure. The system protects the entire ITk (Strips and Pixels) against many failure modes and has the ability to shut down the sub-detector power supplies. Temperature sensors installed in critical areas inside the detector volume provide a large number of inputs to the system. For the strip detector one sensor for each EoS card is foreseen, for the pixel detector one temperature sensor per serial powering chain is foreseen. The procurement of the sensors and cables and the installation to the crates is the responsibility of the sub-detectors. All signals are routed from the detector to the counting rooms where the Interlock Matrix Crates are located. These crates house the discriminators, which create the logical signals, the FPGAs as the primary logic unit, and additional units which map the signals on to the power supplies. Monitoring units (ADCs) are also built into the Interlock Matrix Crates. Signals to or from external systems, e.g. signal from the CO<sub>2</sub> cooling system, the ATLAS wide safe-for-beam interface, Detector Safety System (DSS), and the bake out system can be integrated as part of the system monitoring.

### Deliverables:

PBS	Item	CORE Value [kChF]
2.4.2	Interlock and Protection System	380
2.4.2.1	Temperature sensors	8
2.4.2.2	Interlock Logic Crates	372

### Contribution by Funding Agency:

Germany BMBF	Design, procurement and testing of temperature sensors; Design, procurement and testing of the Interlock Matrix Crates. Installation and testing in the counting rooms.
France IN2P3	Contribution to purchase.

### Deliverable Sharing:

	Temperature sensors	Interlock Logic Crates	Total
	2.4.2.1	2.4.2.2	2.4.2
France IN2P3	13.2%	13.2%	13.2%
Germany BMBF	86.8%	86.8%	86.8%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

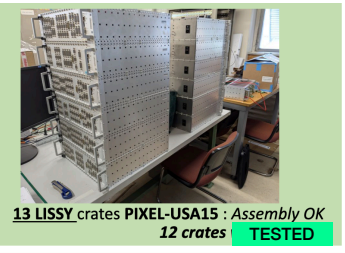
### Work Responsibilities:

2.4.2	Interlock and Protection System	
2.4.2.1	Temperature sensors	
	Calibration	Colombia (Bogota UAN)
	Procurement	Pixel and Strip Sub-Detectors teams
2.4.2.2	Interlock Logic Crates	
	Design, Qualification, QC, Procurement	Germany BMBF (Wuppertal), Canada (Montreal)
	Commissioning	Canada (Montreal)

# 2.4.3 ITk Interlock : Montreal / Wuppertal

1 MIC  
(Pre-prod.)

IPP RS initiated first contact w. UdM group  
in Interlock now UdM manages this WBS



13 LISSY crates PIXEL-USA15 : Assembly OK  
12 crates TESTED



24 LISSY crates STRIP-US15+USA15 : Assembly tes  
TESTE



4 LISSY crates HGTD-USA15 : Assembly OK  
TESTED



1 LISSY crate BCM-USA15 : Assembly C  
Waiting tes

All Interlock LISSY crates for ITk (+HGTD) assembled & tested. Storage in B.190.

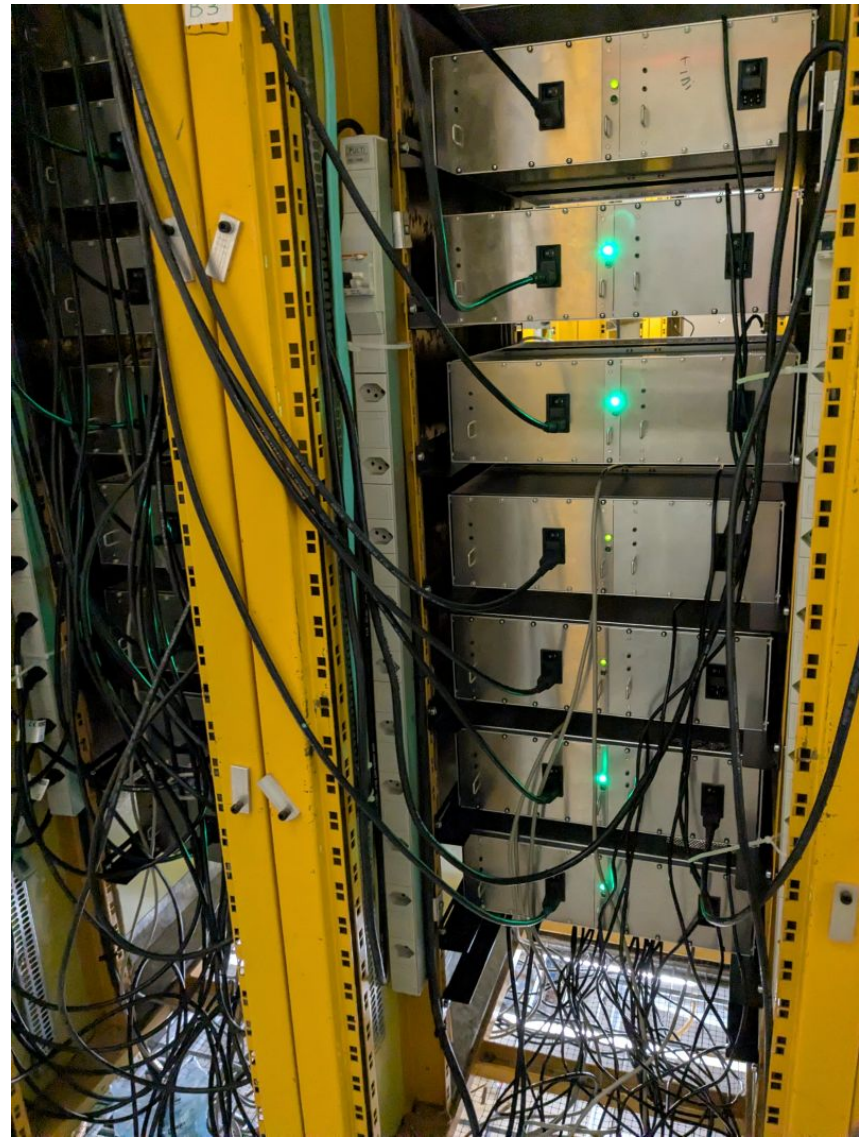
## Pixel US-15 LISSY crates installed in SR1 racks

continued integration w. system tests



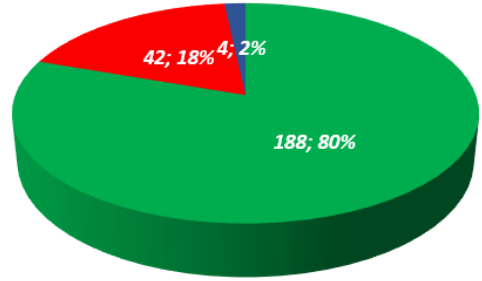
15 LISSY  
(Production)

1 EMP  
(Production)



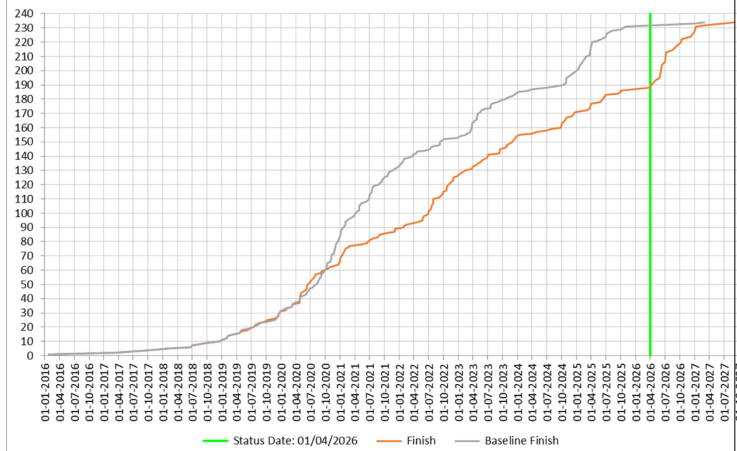
# Summary: Common Electronics: Status and Overview

2.4 ITk Common Electronics Tasks efficiency factor: 82%  
(April-2026)

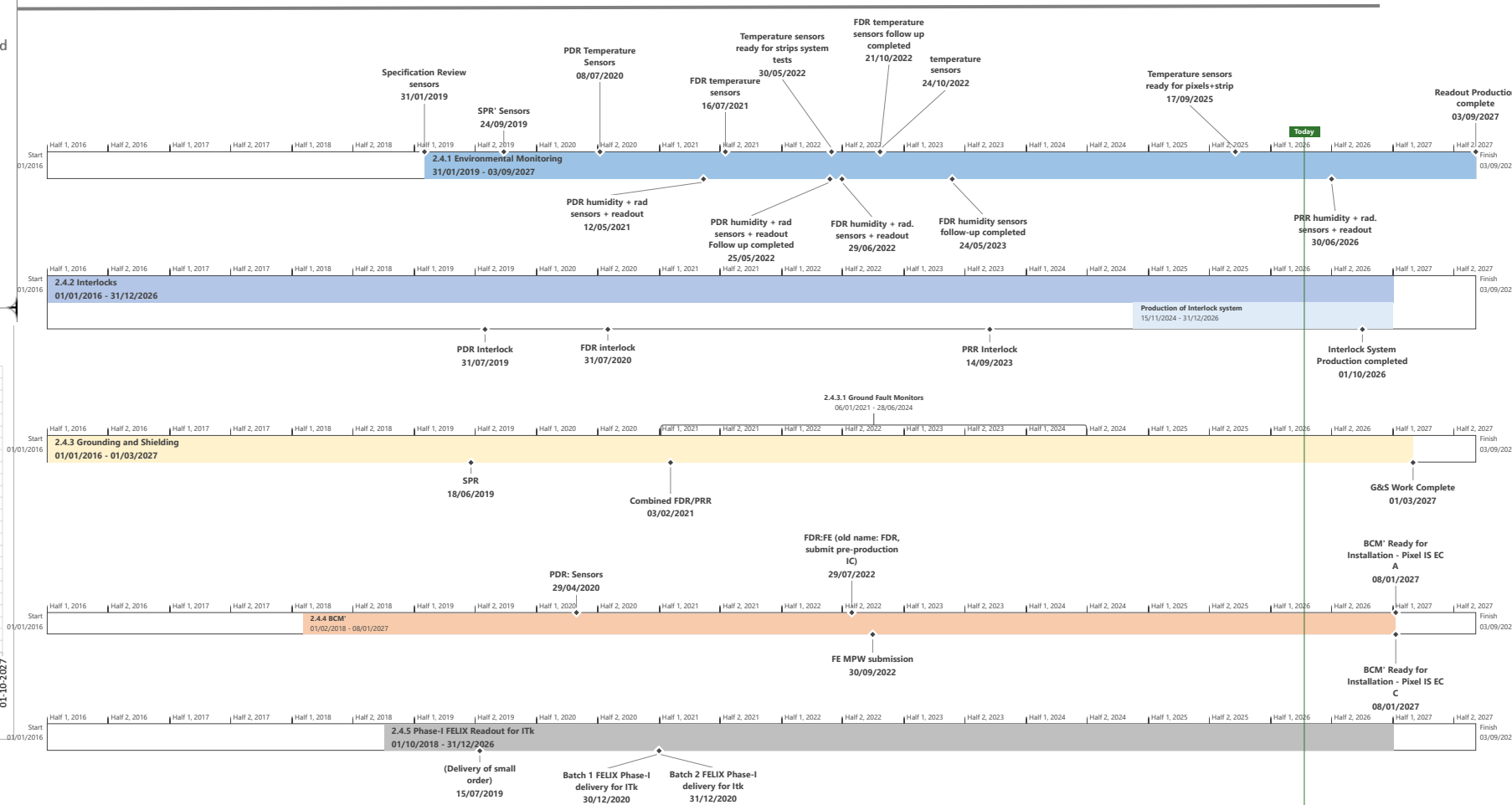


- Number of tasks completed by: 01.04.2026
- Number of tasks expected and not completed by: 01.04.2026
- Total number of remained tasks

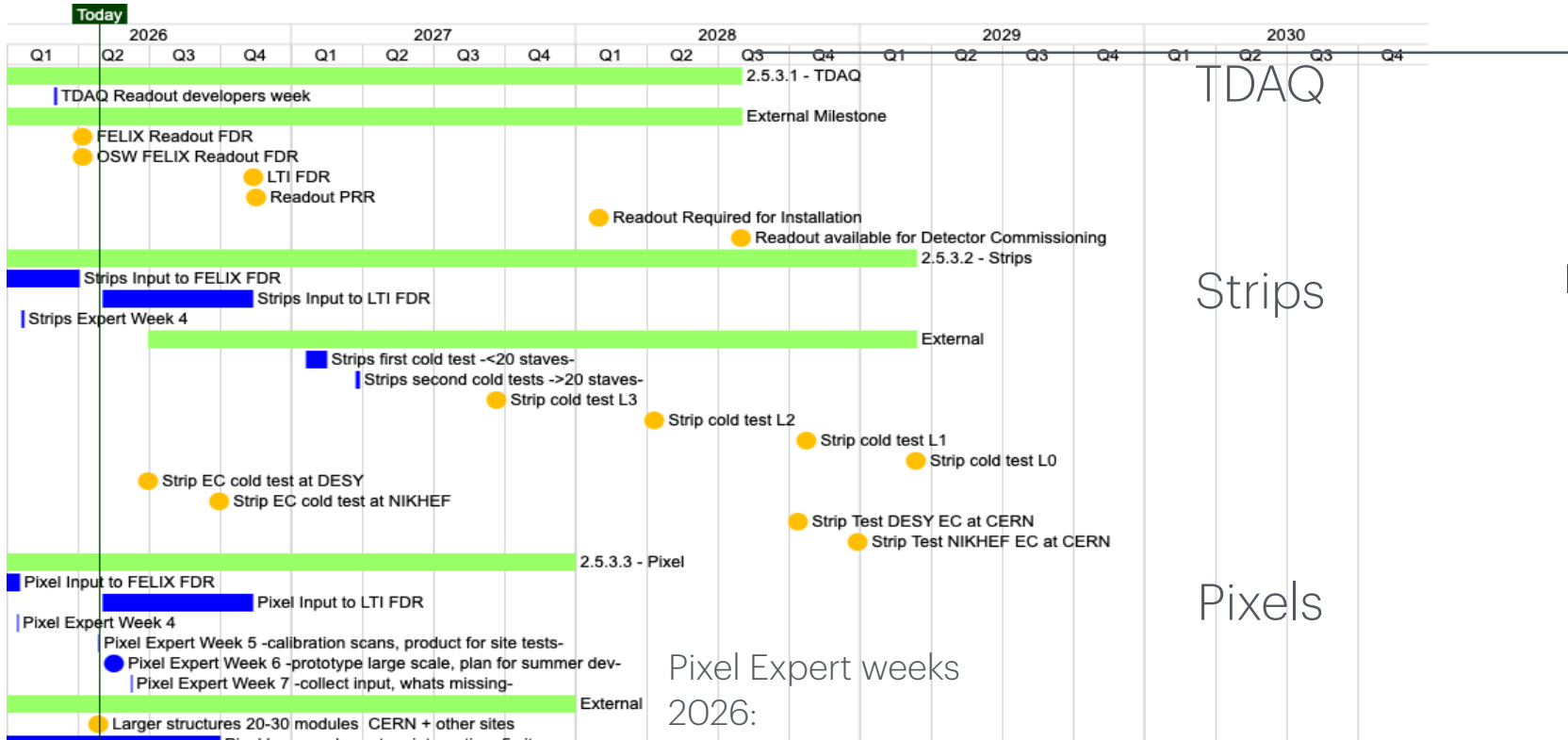
2.4 ITk Common Electronics baseline vs. working schedule



2.4 Common Electronics P2UG milestones\_status 01-04-2026



## 2.5.3 ITk Online Software



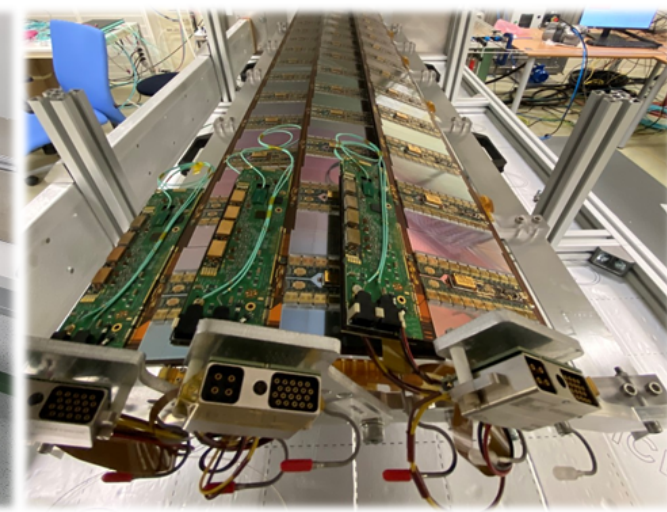
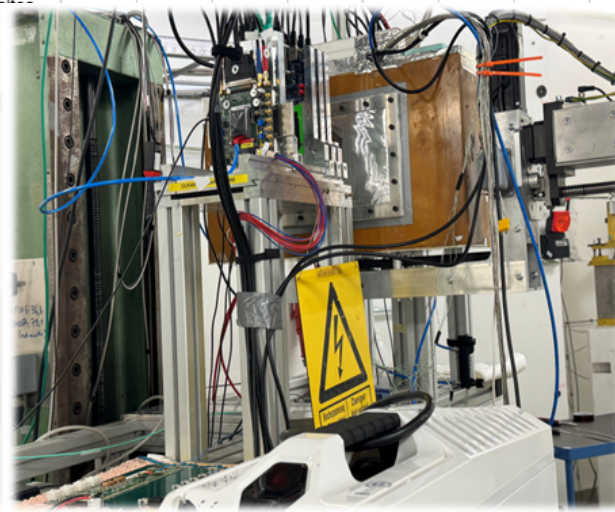
TDAQ

Strips

Pixels

Pixel Expert weeks  
2026:

Strips: Dominique Trischuk, Paul Keener  
 Pixels: Joern-Grosse Knetter, Andreas Korn  
 TDAQ contact: Will Panduro  
 General: Richard Teuscher, Carlos Solans



**Next:**

- E. Anderssen
- T. Claybaugh
- V. Fadeyev
- N. Hartman
- G. Iakovidis
- T. Koffas
- S. Kuehn
- K. Nagai
- J. Pater
- K. Potamianos
- P. Riedler
- D. Robinson
- C. Sawyer
- R. Teuscher
- B. Vormwald
- L. Zwalinski

- Common Activities: This task encompasses common activities for surface integration.
- For Common Electronics, this covers the installation and testing of the environmental monitors for temperature, humidity, and radiation, and the installation and testing of the ITk interlock and detector protection system. In 2.5.3 ITk Common Online Software, the work focuses on the developments towards the final ITk online DAQ system, interfacing to FELIX, and the final common ITk DCS software.

**ITk Integration and  
Installation Effort at CERN**

IPP RS author



ITk Surface integration at CERN: opportunity for Canadian students & postdocs

# Summary IPP & ITk: 2013-2026++

- 2013: ITk Canada consisted of 1 person (IPP RS).
- 2013-2014: Assembled cross-Canada collaboration, secured seed funding: Ontario Centres of Excellence
- 2015: Pioneered contact with Canadian industry - Celestica, Inc.
- 2015: Built first ITk module in Canada w. UofT & Celestica
- 2015-2016: 2 NSERC RTI awards w. ATLAS Canada
- 2015: Prepared ITk part of CFI proposal, prepared detailed ITk-Canada overall budget for proposal of \$25M w. ATLAS Canada
- 2016, Dec. 15: Defended proposal in front of International Review Committee + CFI President + CFI Vice President + NSERC representative (w. ATLAS Canada spokes. + western ITk rep. + UofT VPR + LAr rep.)
- 2017, October 12 October: Official announcement, rated by CFI as :
  - “Excellent / significantly exceeds objective” for “Global Leadership” and “Research Capacity”.
  - “*Overall [CFI] agreed that this outstanding team is proposing world-class transformative research that pushes the limits of existing technology and is in an excellent position to maintain its global leadership.*”
- Successfully awarded “ATLAS Inner Tracker (ITk) Upgrade”, \$24,512,943, together w. ATLAS LAr upgrade for \$4,412,560, total \$29,754,533.
- Today: faculty across Canada incl. new hires @ Carleton, UBC, Board Appointed Employee hire at TRIUMF + students and postdocs will reach ~100 Canadians
- This upgrade will allow Canadian particle physicists to continue to play leading roles in ATLAS in the era of the High-Luminosity LHC (HL-LHC) (2026-2037).

Richard Teuscher / IPP / June 2026





# Looking to the Future: International Committee for Future Accelerators

ICFA, the International Committee for Future Accelerators, was created to facilitate international collaboration in the construction and use of accelerators for high energy physics. It was created in 1976 by the International Union of Pure and Applied Physics. Its purposes, as stated in 1985, are as follows:

Current members:

- P. Campana, Chair, Italy
- T. Schoerner, Secretary, Germany
- P. Sphicas, CERN Member States
- M. Thomson, CERN Member States
- U. Husemann, CERN Member States
- N. Holtkamp, USA
- S. Dasu, USA
- N. Roe, USA
- I. Koop, Russia
- V. Obraztsov, Russia
- J. Cao, China
- U. Egede, Other Countries
- G. Otéro Y Garzón, Other Countries (Latin America)
- B. Mohanty, Other Countries
- T. Nakaya, Japan
- S. Asai, Japan
- R. Teuscher, Canada
- M. Munhoz, Chair of the IUPAP Commission on Particles and Fields (ex officio)

- To promote international collaboration in all phases of the construction and exploitation of very high energy accelerators.
- To organize regularly world-inclusive meetings for the exchange of information on future plans for regional facilities and for the formulation of advice on joint studies and uses.
- To organize workshops for the study of problems related to super high-energy accelerator complexes and their international exploitation and to foster research and development of necessary technology.

The Committee has 16 members, selected primarily from the regions most deeply involved in high-energy physics.

Every three years, the [International Committee for Future Accelerators \(ICFA\)](#) organises a seminar on “Future Perspectives in High Energy Physics”. This is a four-day international exchange of information concentrating on plans for future facilities in the field of particle physics. The meeting is by invitation only and comprises the directors of most of the world’s major laboratories in our field, senior particle and accelerator physicists, and government science officials from several countries.

[The 14th ICFA Seminar 2026 is organised by the High Energy Accelerators Research Organization, KEK in Toyama / Japan.](#)

IPP RS in consultation w. TRIUMF/IPP Directors nominated the 6 Canadian delegates

\* **IPP RS Also represents Canada on ACCU** = Advisory Committee of CERN Users. The advisory committee of CERN Users is a forum for information, exchange and discussion between the CERN Management, Ex-Officio members and the appointed representatives of CERN Users to review the practical means taken by CERN to support the work of Users at the Laboratory.

# Le CERN signe une déclaration d'intention commune avec le Canada

La déclaration d'intention commune signée par le CERN et le Canada porte sur la planification future de grandes infrastructures de recherche et de nouveaux instruments et techniques de pointe



CERN has signed a joint Statement of Intent with Canada concerning future planning for large research infrastructure facilities, and novel and advanced techniques and tools. The Statement was signed by CERN's Director-General, Fabiola Gianotti, and Canada's Deputy Minister of Innovation, Science and Economic Development, Philip Jennings.

The Statement details how CERN and Canada intend to strengthen their collaboration in the planning of future projects, including the ongoing [Future Circular Collider \(FCC\)](#) studies, and to expand cooperation on innovative technologies, with a particular focus on the three technology pillars of the field – accelerators, detectors and computing.

With a special note about how fundamental research at major facilities and open science drive technological development and innovation in many domains of society, the Statement acknowledges Canada's strong contributions to the forthcoming [High-Luminosity Large Hadron Collider \(HL-LHC\)](#). It also establishes that, should the CERN Member States determine that the FCC is likely to be CERN's next world-leading research facility following the HL-LHC, Canada intends to collaborate on its construction and physics exploitation, subject to appropriate domestic approvals.

The Statement builds on the [decades-long participation of Canadian institutions and scientists](#) in the scientific programme at the [Large Hadron Collider \(LHC\)](#) and at other CERN experiments and facilities, acknowledging the extensive collaboration of Canada and CERN in high-energy particle physics, technology development, innovation, training and education.

Initiated by **IPP RS**, followed by strong collaboration with IPP & TRIUMF Directors + ISED

**From:** Fabiola Gianotti <Fabiola.Gianotti@cern.ch>

**Subject: Re: Canada in kind**

**Date:** April 1, 2025 at 7:27:57 AM GMT+2

**To:** Richard Teuscher <Richard.Teuscher@cern.ch>

Dear Richard,

Again many thanks for your invaluable help in getting the agreement signed. I think the first time I discussed this it was actually with you.

All the best,

Fabiola

Richard Teuscher / IPP / June 2026



## Interactions: VIP Canada visits to CERN led by IPP RS



- **Ms Patricia Lyn McCullagh, Minister-Counsellor, Deputy Permanent Representative of Canada to the United Nations Office and other international organisations in Geneva, July 1, 2026**
- His Excellency Jean-Paul Lemieux, Ambassador of Canada to Switzerland and Lichtenstein, Jan 28, 2026
- Dr. Mona Nemer, Chief Science Advisor of Canada, CERN, May 2018.
- Members of the Quality Network Universities of Canada with Presence Switzerland, March 28, 2018.
- Susan Bincoletto, Ambassador of Canada to Switzerland and Lichtenstein, + Canadian high school, Sept. 29, 2017.
- Mr. A. Philp, Bombardier Canada, CERN visit, July 8, 2017.
- The Honourable Stéphane Dione, Minister of Foreign Affairs, Government of Canada, March 1, 2016.
- Dr. Nigel Smith, SNOLAB Director, Feb. 29, 2016.
- Prof. J. Bagger, TRIUMF Director, December 2015.
- Mr. Kit Leitch, Alberta, Canada, October 2014.
- William H. Smith, Vice-president, Mosaic Capital Corporation, NRC IRAP Advisory Board, Sept. 25, 2014.
- Prof. Antony Masi, Provost, McGill U., June 23, 2014.
- The Honourable Dr. Kellie Leitch, Minister of Labour and Minister of Status of Women, June 10, 2014
- Senior Management, Canada's Advanced Research and Innovation Network CANARIE, May 22, 2014
- Her Excellency Ms. Jennifer MacIntyre, Ambassador of Canada to Switzerland and Liechtenstein, May 14, 2014
- The Honourable Lisa Raitt, MP and Minister of Labour, June 18, 2013

- Dr. Paul Young, FRSC, Chair TRIUMF Board of Management, and Dr. Gilles Patry, President and CEO Canadian Foundation for Innovation (CFI), Nov. 26-27, 2012
- Dr. Heidi-Christina Bandulet, Senior Programs Officer, CFI, March 22-23, 2012
- Ambassador Mrs. Roberta Santi, Bern, Feb. 2012, & March 2010.
- Mr. Joseph Daniel, Member of the Canadian House of Commons, November 2011.
- Dr. Danial Wayner, Vice President, Frontier Science, NRC, October 2011
- Mr. Konstantinos Georgaras, Director of Policy, International and Research Office, Canadian Intellectual Property Office, September 2011
- Dr. Kim Matheson, Vice President (Research and International) Carleton University, July 2011
- John McDougall, President, NRC, November 2010
- Mr. John Gero, Canadian Ambassador and Permanent Representative to the World Trade Organization, October 2009. Mr. Bruce Gitelman, Royal Canadian Institute for the Advancement of Science, October 2010
- Mr. Peter Allen, President, Mercator Investments Ltd., Council, CIAR/CIFAR, March 2010, also November 2007
- Commissioner Diana Nichols Nelson, Canadian Senior Trade Commissioner, Bern, March 2010, & October 2008
- Ambassador Robert Collette, Canadian Embassy, Bern, October 2008
- Mr. Mike Lazaridis, Research In Motion, October 2006, November 2003, & June 2001
- Dr. Martin Taylor, VP of Research, University of Victoria, member of TRIUMF Board of Management, May 2006
- Dr. Pierre Coulombe, President, National Research Council, October 2005
- Dr. Howard Burton, Executive Director, Perimeter Institute for Theoretical Physics, January 2003
- Dr. Thomas Brzustowski, President, NSERC, August 2002

+ ATLAS Experiment & Computing LHC Resource Review Board meetings twice / year (NSERC, NRC)

# HQP Training students, postdocs, staff

