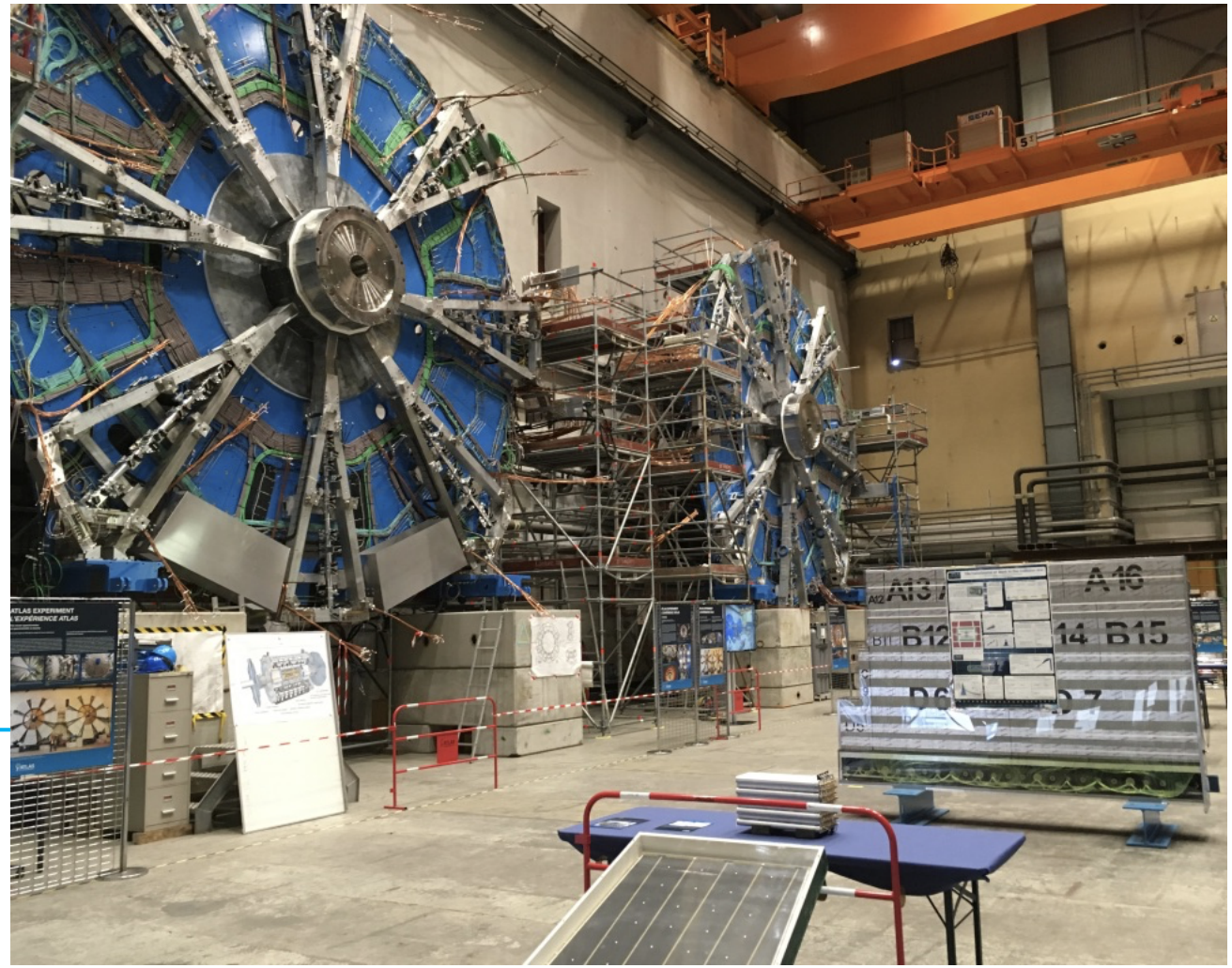
TRIUMF

ATLAS Update

ACOT November 2019

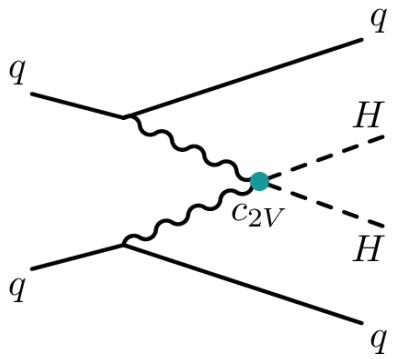
I.Trigger for the ATLAS group at TRIUMF



Group News

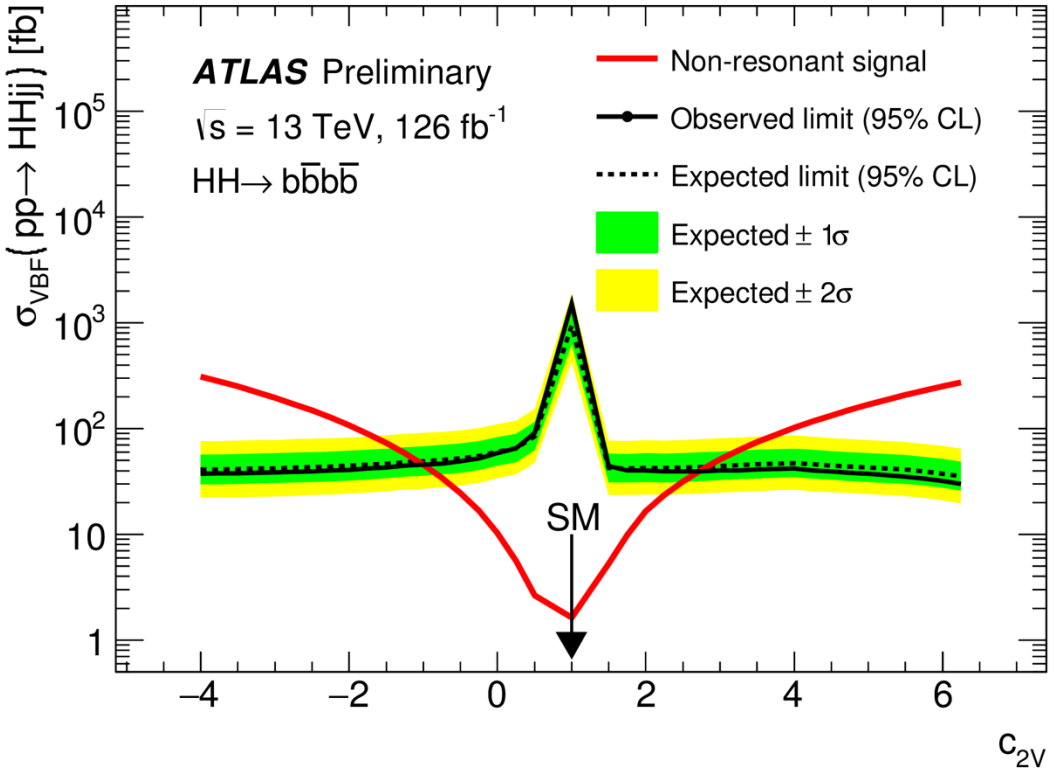
- Max Swiatlowski joined us in October as 5th ATLAS BAE
- Two PhD, one MSc defended successfully since April.
- Our colleague David Axen passed away in September

Analysis Highlights



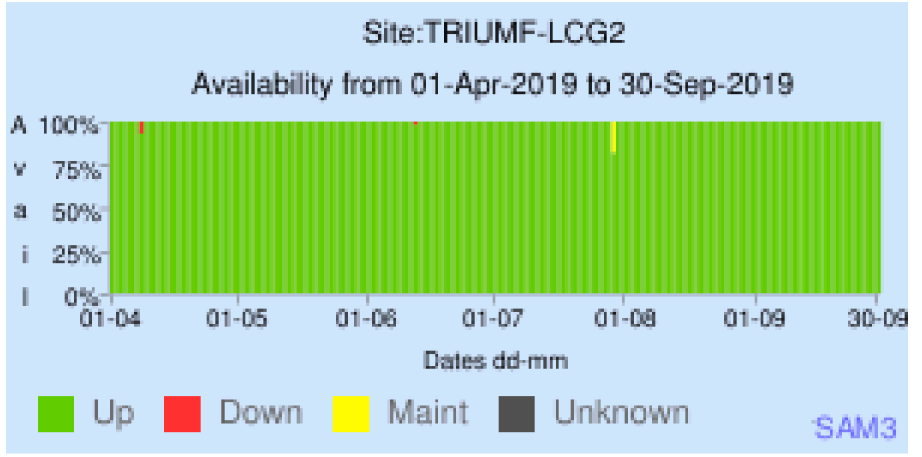
ATLAS-CONF-2019-030

- Recent result with TRIUMF editor and analysis contact: world's first limit on coupling between two vector bosons and two Higgs bosons in search for HH→bbbb
- Oliver appointed ATLAS Exotics Working Group Convener from October



Tier 1 Centre

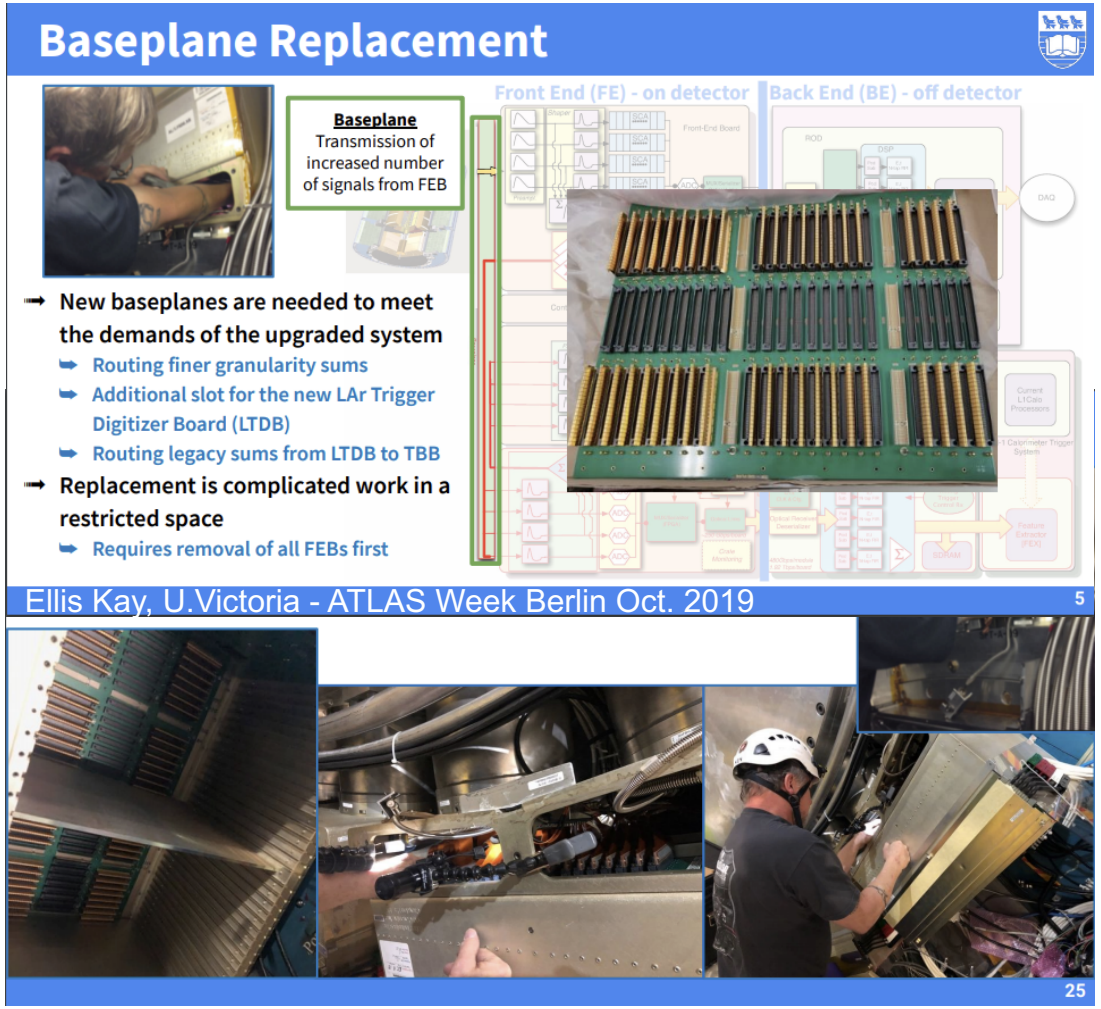
- Our long-time lead sys admin retired in October
  - Deadline on internal ad for her position was Nov.1
  - Expect to finalize succession hire quickly
- Development of new CFI proposal to take us through to LS3 and be ready for HL-LHC:
  - Total project cost is $5.4M.
  - Plan to add only 5.5 PB of disk, 5.6 PB tape, ~1,500 cores
    - already a large-scale deployment on the floor from recent purchases
  - Also adding co-processors/accelerators (small-scale) plus about 1.5 FTE dedicated to this project.
  - 21% of total budget is for extended warranties/support contracts on equipment purchased last year, now allowed to be part of capital request.



TRIUMF-LCG2 **Avail: 100%** **Unkn: 0%**

Liquid Argon Calorimeter Upgrades (TRIUMF/U.Victoria)

- LAr Phase-I:
  - Four hadronic end-cap baseplanes installed in side-A
  - Four more ready for side-C +1 spare. All 5 fully tested at UVic & ready to go; keep at TRIUMF until requested by CERN.
- LAr Phase-II:
  - ASIC prototype (HPS1) designed, submitted for manufacture in Sept.
  - Designing PCBs for various ASIC tests.

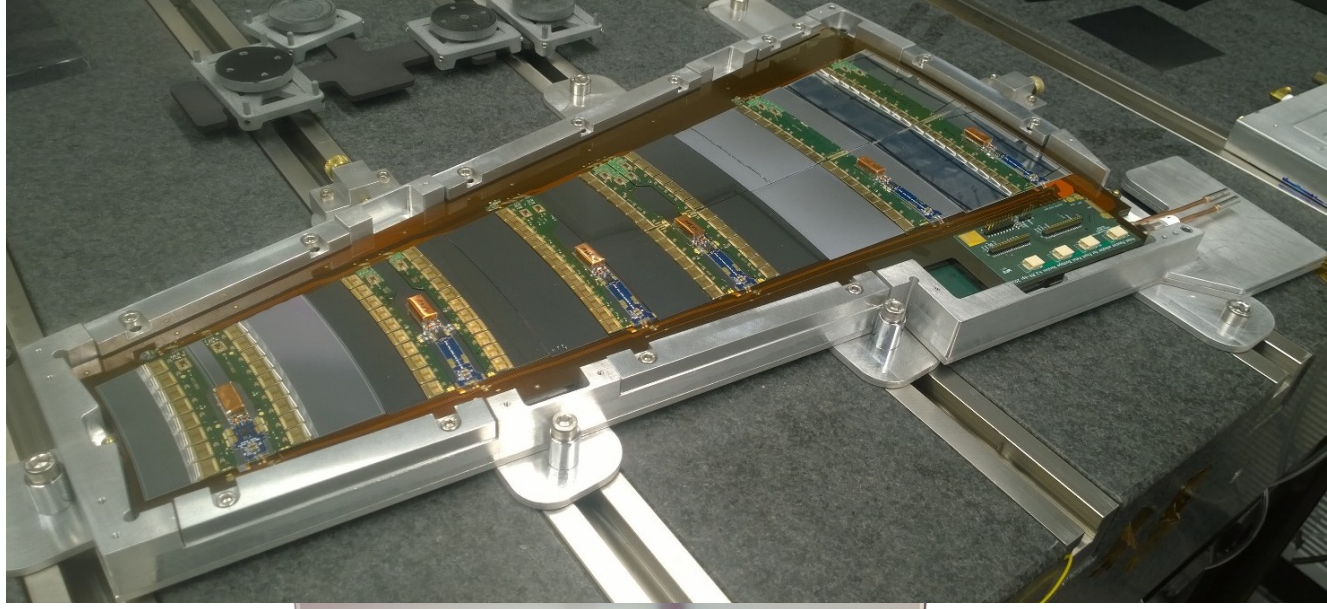


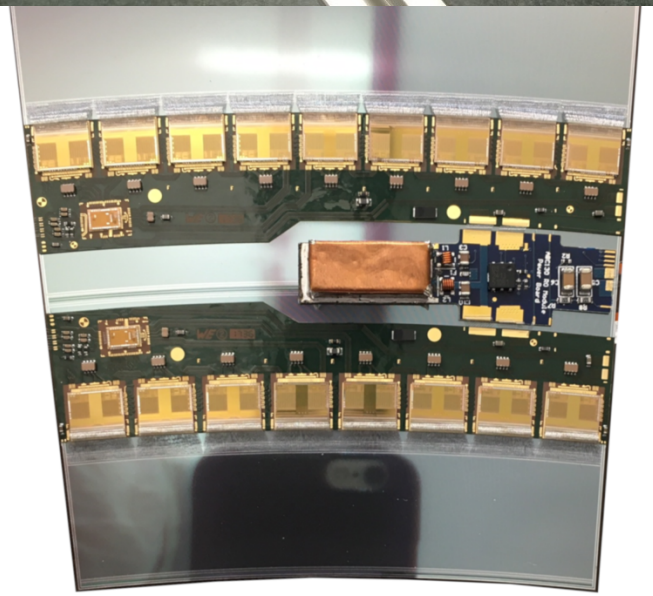
Thin Gap Chambers – Muon New Small Wheel

- Expect to complete half-gap production at TRIUMF by May
- Need to keep facilities intact longer as Carleton will not complete quadruplet assembly until end 2020
- Transfer experienced personnel to primarily ITk work, so they remain available for sTGC returns & repairs (avoid standing army problem)
- Integration progress at CERN:
  - 1st Large Wedge glued & turned
  - Mechanical small sector test completed (2 sTGC wedges + 1 MM double-wedge)
- NSW Readiness Review held Nov. 4-5 at CERN to determine when NSW-A can go in
- TRIUMF post-doc gave the sTGC talk at Lepton-Photon in Toronto this summer

Inner Tracker End-cap Sensors & Petals

- ITk-Vancouver completed an R0 module with an on-board power-board at TRIUMF
which was loaded on semi-electrical petal. Noise was same before and after loading.
- Made a first module at SFU site.
- First module mounting on petal: "Semi-electrical petal”
  - Mounted one side (9 sensors),
  - Measured placement precision better than 20 μm. “First fully loaded petal with electric readout (for all of ATLAS) built at TRIUMF”
  - Read out in test set-up,
- Carried out Single Event Upset tests on module ASICs at TRIUMF PIF.
  - Measurements showed SEU rate of current design is too high, and showed what needs improving.
  - Next design round will incorporate lessons learned.
- Sensor Mounting on Petal: https://www.youtube.com/watch?v=G_Cj0bTyhg4&list=LLc1yftp-v6rJ06gYbeApMpQ&index=3&t=3s





Summary

- The ATLAS group was augmented by the hire of Max Swiatlowski as a BAE in October. Two PhDs and an MSc have been earned by students in the group since April. The group continues to lead efforts in interesting analyses. The LAr Phase-I upgrade work is complete in Canada; the team is now designing and prototyping ASICs for Phase-II. Half-gap production for the NSW sTGC is nearing completion, but in order to remain responsive to issues further down the quadruplet production chain until the end of 2020, technicians are being gradually migrated to ITk. The ITk team has successfully built the first "semi-electrical petal" in ATLAS, with all 9 modules mounted on one side, and read out. The Tier-1 Centre is preparing a CFI proposal to carry Canada's commitments through to the start of the HL-LHC.