

Particle Physics Faculty Meeting

- Agenda
 - News/Updates
 - Committee updates

Unexpected News!

Dear APS Member,

I have the pleasure to announce that theoretical physicist Jonathan Bagger has been selected to succeed Kate Kirby as APS CEO in 2021. Bagger is Director of TRIUMF, Canada's particle accelerator center in Vancouver, British Columbia. The APS Board of Directors unanimously approved his appointment at a June virtual meeting.

The Board acted on the recommendation of the CEO Search Committee, chaired by 2020 APS Past President David Gross. Bagger's extensive experience in scientific management and his deep commitment to APS and its critical mission will serve the Society well in these tumultuous times.

Bagger has directed TRIUMF since July 2014. He was previously Krieger-Eisenhower Professor in the Department of Physics and Astronomy at Johns Hopkins University, where he served as chair of the department and held several senior administrative positions.



Particle Physics Return to Site

- Our quotas have been steadily increasing (now at ~10)
- Currently averaging about 8-9 people on site, with 11 at peaks

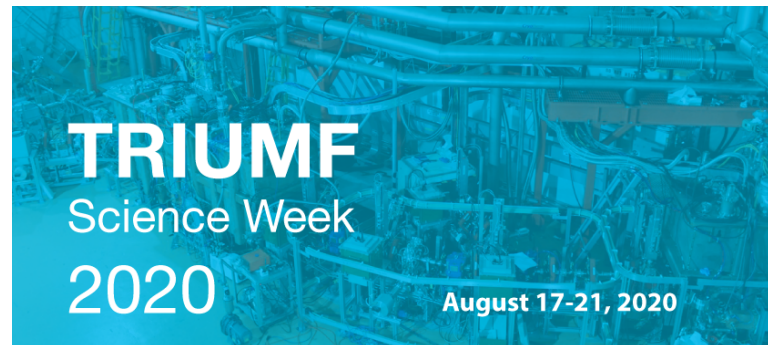
- If you would like to come to TRIUMF, enter your slot (AM/PM) for the following week
- At this point, can have faculty, postdocs and students for half day/day

- Be sure you have taken the “back to site training” otherwise site access removed
- Link to planning page per week
 - https://triumfoffice365-my.sharepoint.com/:x/g/personal/amcgowan_triumf_ca/EW7BfKwBkGZlgsc2NDdd9sEBCDTiVid26ePvTUJeVC3xMQ?e=rhuKr3&wdLOR=c4F16CD38-2115-3743-A577-397E3B50E51C

- If you need to modify an entry or have last minute request during the week, please let me know

- Thanks to Mark Hartz for taking on the planning for next 2 weeks!

Science Week

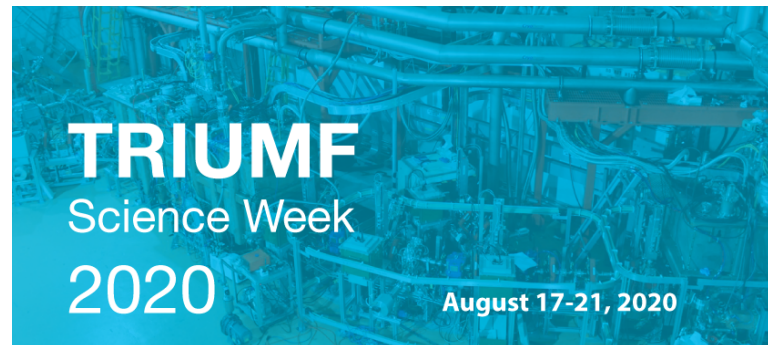


- Online, via Zoom
 - <https://meetings.triumf.ca/indico/event/116/timetable/#20200817>

- Several TRIUMF Particle Physics talks
 - **TRIUMF at the Precision Frontier – Beatrice**
 - **TRIUMF and SNOLAB-based Astroparticle Physics Projects – Wolfgang**
 - **TRIUMF and International Accelerator-Based Particle Physics – Isabel**
 - **Reaching New Frontiers with Liquid Argon Detectors – Pietro**

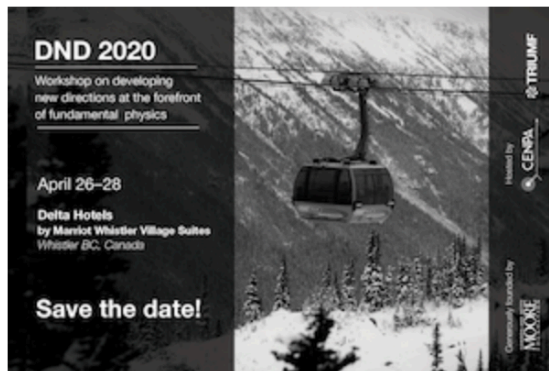
- In addition to invited speakers (theory and computing), SciTech talks
 - **“Photon/Particle to Digital” converters - a new generation of integrated detectors – Fabrice**
 - **TRIUMF Science Technology Department: towards a long-range plan – Nigel**and parallel session on PP, Detectors, ML & QC...

Science Week



- Input to Jens's talk:
 - **Navigating Remote Research and Networking in the 'Post'-Pandemic Era: Lessons Learned & Future Outlook**
 - Lessons Learned:
 - Working from home can be effective
 - Online meetings are more democratic, rather than an “in person vs virtual audience division”
 - Careful planning has been needed to keep hardware related research tasks that require lab access going.
 - At the same time: nothing replaces in person interactions
 - ...
 - Future Outlook:
 - “Home office” might ease the space crunch at TRIUMF
 - Still need in person meetings
 - Balance between online and in person meetings, where is each most effective?
 - ...

New Directions Workshop



Developing New Directions in Fundamental Physics (DND) 2020

4-6 November 2020
Zoom
America/Vancouver timezone

Overview

Timetable

Contribution List

My Conference

DND2020 has been rescheduled as a fully online event due to COVID-19. We will hold future iterations in this series in person if it is safe to do so.

New Avenues to Probe Fundamental Physics in the Pacific Northwest

If interested in registering for this event, please email sciencediv@triumf.ca.

Undergrad students

- From Dana:
- As you may already know, the government of Canada's Student Work Placement program (SWPP) has changed its requirements due to COVID-19. We are now able to apply for positions for this Fall 2020 term and the Winter 2021 term. Our applications are processed through Biotalent Canada.
- If you have a student in mind that you would like to hire for the Fall 2020 or Winter 2021 term, but do not have enough funds, your position/student could qualify for up to 75% of the student's salary. The balance of the salary would need to be paid by you.
- If you are interested, please let your ALD know, and have the position and student approved – then let me know that you would like to proceed.
- Any position that you wish to apply for funding for, must have a student already identified, as we are not recruiting for undergraduate positions yet.
- We can offer the position to the student contingent upon approval of the funding.

Science Division Website Update

- From Allayne:
- The process will be as follows:
 - Group leaders / designated editor will fill out the form and send it to me for review
 - I will then pass it along to Stu
 - Stu will work with the group leader / designated editor to either create a new page or update the existing one
 - I would like to propose a deadline of Friday, July 31st to receive forms back from the group leaders / editors so that we can get a good start on this and keep it at the forefront of everyone's minds
 - Any questions can be directed to myself and/or Stu and we'll get it sorted.
 - Allayne said she only received 2 so far

COMSOL license

- Patrick was approached by Aurelia
- October 1st is the time of the year to renew the COMSOL license. I would like to encourage Patrick to ask Science Division to purchase a COMSOL seat. The price is not too high: approximately 4,000 US\$ for the first time, and then it goes down to 798 US\$ per yer (for maintenance and COMSOL technical support). Please note: Acc Div already purchased many modules.
- How many use COMOSL for students?

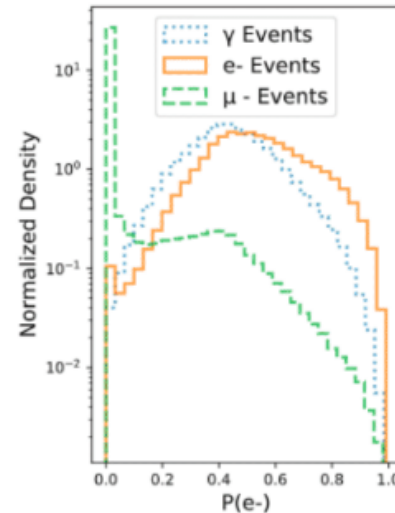


Slides from SMM

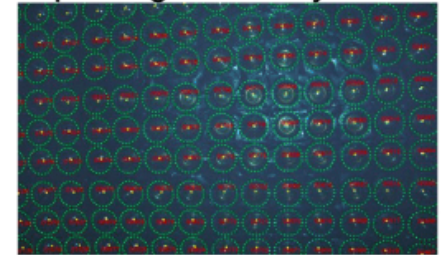
Particle Physics

- Hyper-K Canada online meeting held July 8 & 9
- Highlights include reports on:
 - Machine learning
 - Photogrammetry calibration
 - mPMT mechanical and electronics prototypes
- IPP LRP Townhall on July 15,16,21
- Reports on TRIUMF involved projects including: ATLAS, T2K, Hyper-K, ALPHA, TUCAN, SuperCDMS, nEXO, NA62, DEAP
- Additional reports on Accelerator R&D, MRS & TRIUMF Support for PP community, Photon to Digital detectors

PID with Convolutional Neural Network



Feature recognition for photogrammetry



mPMT main board prototype



- Research highlights from particle and nuclear physics

PHYSICAL REVIEW LETTERS **125**, 051801 (2020)

Editors' Suggestion

Search for Heavy Higgs Bosons Decaying into Two Tau Leptons with the ATLAS Detector Using pp Collisions at $\sqrt{s} = 13$ TeV

G. Aad *et al.**
(ATLAS Collaboration)

 (Received 28 February 2020; accepted 26 June 2020; published 27 July 2020)

PHYSICAL REVIEW LETTERS **125**, 032701 (2020)

Direct Measurement of the ${}^7\text{Be}$ L/K Capture Ratio in Ta-Based Superconducting Tunnel Junctions

S. Fretwell¹, K. G. Leach^{1,*}, C. Bray¹, G. B. Kim², J. Dilling³, A. Lennarz³, X. Mougeot⁴,
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 (Received 6 March 2020; revised 19 May 2020; accepted 25 June 2020; published 14 July 2020)

Physical Sciences

- Theory
 - Olivia Di Matteo leaving TRIUMF for Xanadu
 - Helped develop local expertise in applications of quantum computing

Observation of Vector Boson Fusion production of Higgs->WW

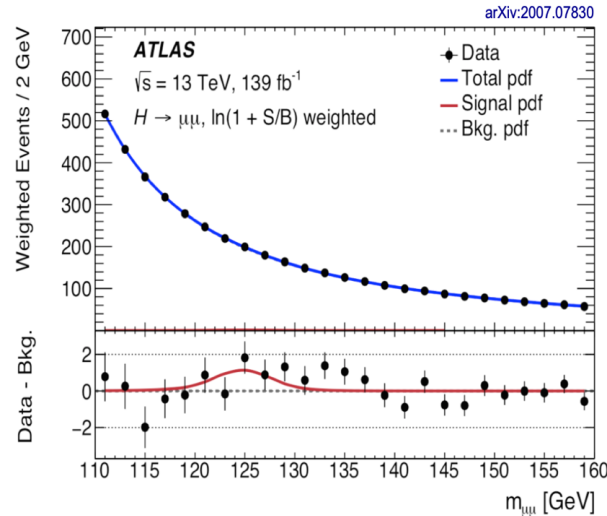
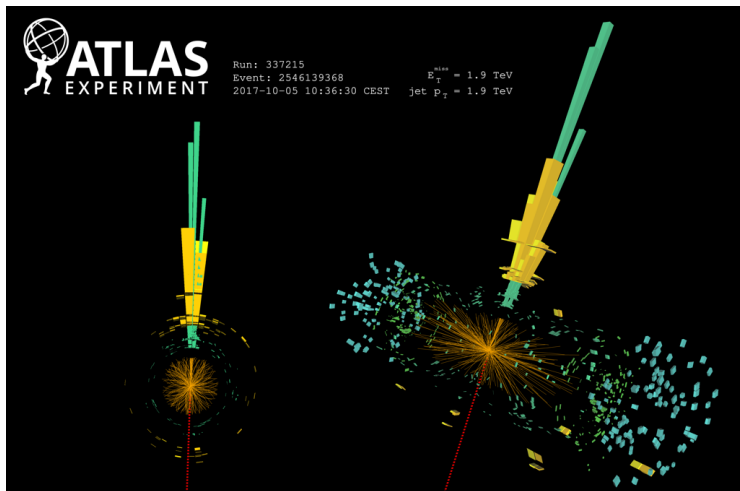
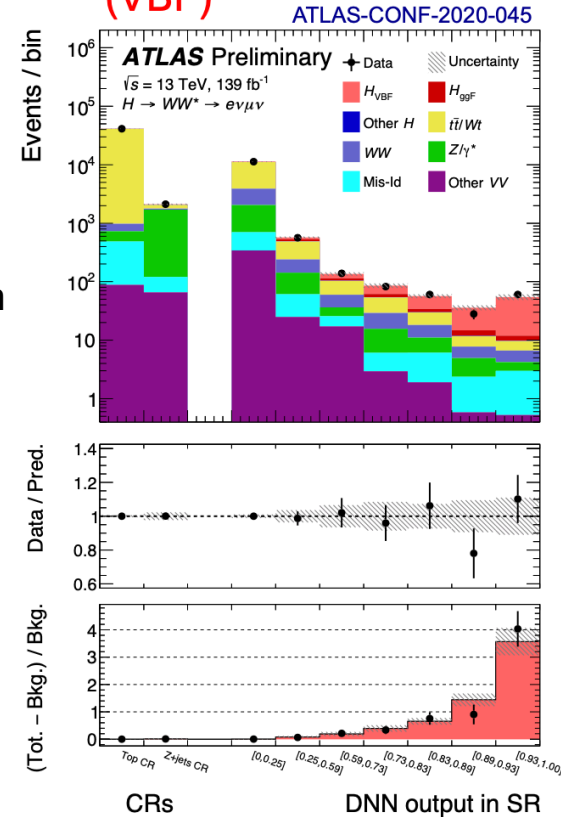
ATLAS

- ATLAS has 35 new results for ICHEP conference
- Some select examples

Mono-Jet search – golden channel with many interpretations
 Dark Matter search, compressed SUSY, axions, extra dimensions...

Higgs coupling to 2nd generation H→μμ signal Evidence!
 CMS 3σ, ATLAS 2σ

H → WW* → eν μν (VBF)

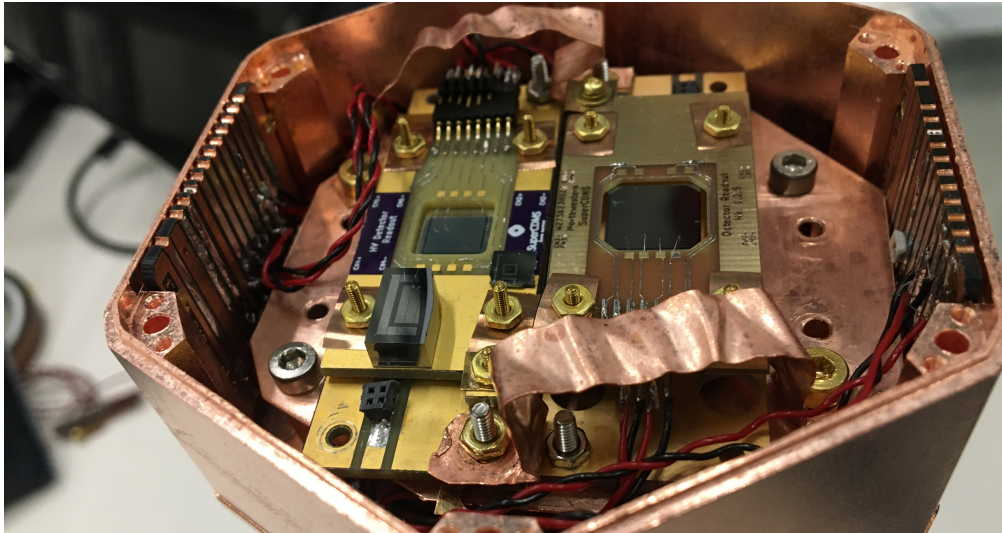


$\sigma^{\text{VBF}} \cdot \text{BR}_{\text{WW}} = 0.85 \pm 0.10 \text{ (stat)} \begin{matrix} +0.17 \\ -0.13 \end{matrix} \text{ (syst) pb}$
 $\sigma_{\text{SM}}^{\text{VBF}} \cdot \text{BR}_{\text{WW}} = 0.81 \pm 0.02 \text{ pb}$
 Obs. (exp.) significance: 7.0σ (6.2σ)

Particle Physics - SuperCDMS

SuperCDMS lab at TRIUMF:

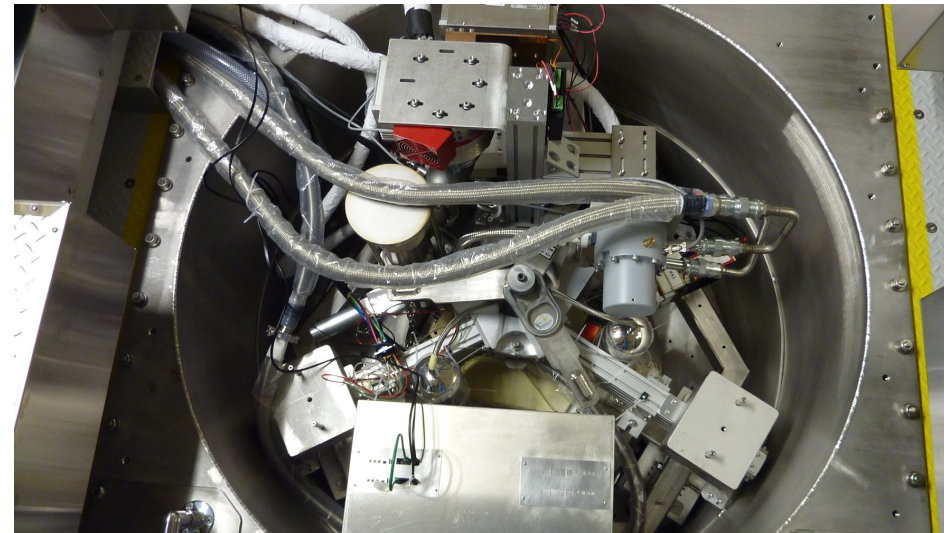
- The detector test facility at TRIUMF is operational
- Detector tests are ongoing
- First data of interest have been acquired:



Two single eh-pair detectors, ready to be installed into the cryogenic detector test facility at TRIUMF

Restart of CUTE operations at SNOLAB

- We are implementing new modes of operation with a minimal on-site crew (SNOLAB employees) with ample off-site support
- Since Aug. 6 the CUTE cryostat is cooling down with monitoring by remote shifters around the clock.
- Detector testing is expected to start this week.



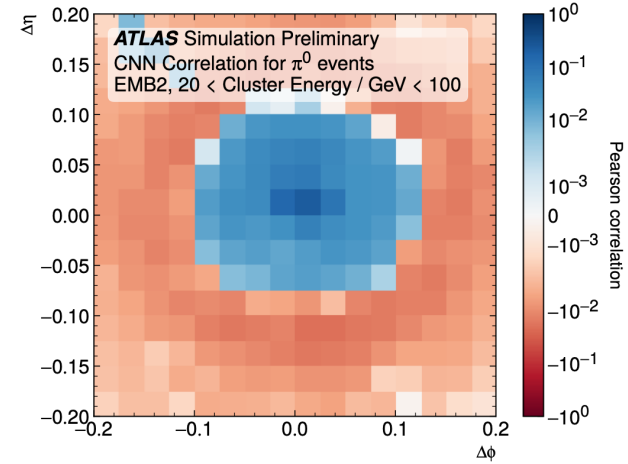
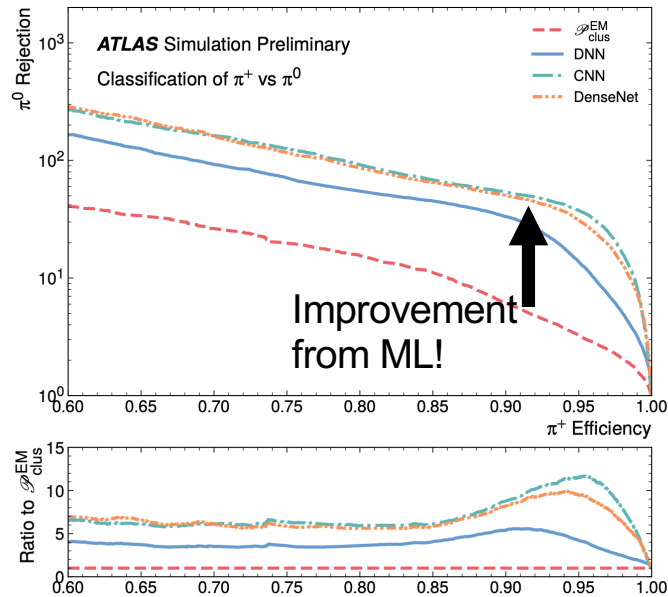
Top view of the CUTE cryostat mounted in the drywell inside its shielding water tank at SNOLAB

Particle Physics – ATLAS+Machine Learning

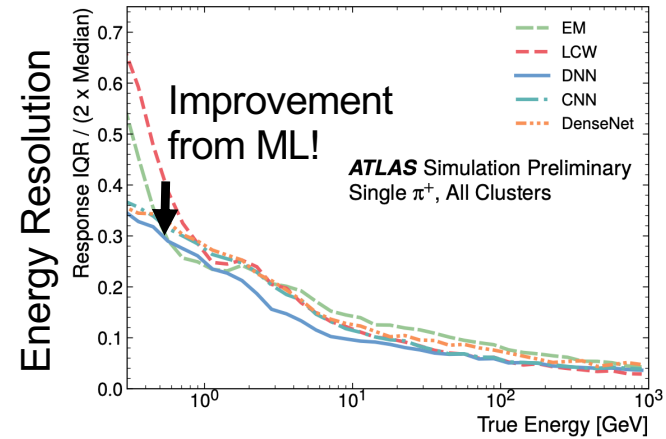
New [ATLAS results released](#) using Machine Learning for pion identification and calibration

Effort led by M. Swiatlowski, in collaboration with W. Fedorko and others

Next steps: Implementation into ATLAS and full testing; NFRF-E for trigger applications on FPGA



Visualizing ML output: Blue is π^0 -like, red π^+



Committee Updates

- IPP/MISnomass/Snowmass
- New Initiative Planning
- Seminar/Colloquia
- Safety
- Space
- 5S
- Academic
- Summer schools
- Health & Wellness
- Data Science
- Diversity committee
- Physical Sciences Division Structure
- PPR Working Group

Round Table

- ATLAS
- T2K/HyperK
- UCN
- ALPHA
- SuperCDMS
- Pienu
- NA62
- DEAP
- SNO+
- EXO
- HALO
- g-2
- Belle 2
- Theory



Next Meeting

- September 10th