Particle Physics Faculty Meeting

- Agenda
  - News/Updates
  - Committee / Research groups updates

Goals and Objectives

- Key Goals taken from 5YP, matched to divisional goals and objectives
- Not the final version, so please send feedback

TRIUMF FY 2020/2021 PSCI division OBJECTIVES

Key Dimensions	Key Goals 5YP	Divisional Goals	Objectives	Report by	Completion Date	Status	Comment
Science and Technology	1) Make groundbreaking discoveries across TRIUMF's multidisciplinary research portfolio	Lead and participate in SAP research including delivering high-impact results in PP, NP, experiment and theory.	Complete scientific and technical analysis and publish results from Particle Physics, focus on ATLAS, T2K, UCN, ALPHA, SuperCDMS to test SM and BSM.	J Dilling	Mar-21	ongoing	department heads report and review
		Publish scientific results in SAP 210 publications total (160 in PP and 65 NP, for exp & theory)	Use rare-isotopes to lead and execute experimental programs in nuclear structure, nuclear astrophysics, and tests fundamental physics, with focus on ISAC, and complementary external programs.	J Dilling	Mar-21	ongoing	department heads report and review, consider effects for COVID pandemic
		Enable Canadian Scientists and students to participate in research abroad (through TRIUMF collaboration or contributions) for up to 200 people	Develop and execute SAP theory methods to lead, guide and support the TRIUMF program	J Dilling	Mar-21	ongoing	TD head
		Enable Canadian Scientists and students to participate in research at TRIUMF for up to 200 people		J Dilling	Mar-21	ongoing	might be effected by COVID pandemic
		Deliver Data Science and Machine Learning applications to enhance research output	Deliver machine learning techniques to enhance sensitivity of experiments or improve operation for a min of 4 projects (and publish results)	J Dilling	Mar-21	ongoing	SC head, mitacs application pendinc
	2) Leveraging our strength in Accelerator Science and Detector Technology	Develop and deliver technical contributions to SAP physics experiments	Using TRIUMF core technical expertise in PSD, complete PM milestones (up to 10 Gate Reviews) for technical contributions and document or publish results (see above) and developments	J Dilling	Mar-21	ongoing	department heads report and review
		Support the ARIEL Project with PSD expertise with a minimum of 5 FTE		J Dilling	Mar-21	ongoing	ARIEL Principle Scientist involvment
	3) Driving the Revolution in Quantum Materials	Develop and deliver technical contributions to the Molecular Studies and Quantum Material program at TRIUMF	Using TRIUMF core technical expertise in PSD, complete PM milestones (5 Gate Reviews) for technical contributions	J Dilling	Mar-21	ongoing	MMS head
		Lead and execute experimental programs at TRIUMF for Molecular Studies and Quantum Materials (called MMS) using secondary beams (rare isotopes and muons)		J Dilling	Mar-21	ongoing	MMS head, pandemic impact
		Deliver high-impact results in MMS and quantum materials and publish in peer reviewed journals (40 publications)	Prepare and execute experimental programs at TRIUMF for the CMMS community	J Dilling	Mar-21	ongoing	MMS head
People and Skills	4) Become a hub for interdisciplinary education and training	Deliver training graduate and undergraduate students in PSD research activities for a minimum of 60 students	Training and mentoring students (60)	J Dilling	Mar-21	ongoing	department heads and Marcello
			Mentor Program for non tenured BAEs in PSD (5 mentees)	J Dilling	Mar-21	ongoing	
	5) Inspire Canadians to discover and innovate	Deliver expert and non-expert presentations about research and discoveries from TRIUMF (min of 100)		J Dilling	Mar-21	ongoing	
Innovation and Collaboration	6) Translate knowledge and discovery into innovation	Harnessing our technologies to solve real-world problems	Deliver a concept to transfer UV photon detection technology	J Dilling	Mar-21	ongoing	F Retiere

Hiring

- ALPHA position confirmed by management but officially delayed until 2022/23
- Jens will try to re-negotiate after theory hire is complete to advance timescale for ALPHA

- In the process of the ongoing Nuclear Physics BAE hire, opportunity for a dual career BAE hire
- Procedure was discussed and agreed on with the Personnel Committee of the Board
- Hiring Committee
  - Chair: Roxanne Guenette (Harvard)
  - Michele Lefebvre (Victoria)
  - Gerald Gwinner (Manitoba)
  - David Morrissey
  - Beatrice Franke
  - Oliver Stelzer-Chilton
- Committee will review application and interview, if “above bar” will invite for public colloquium including meetings with BAE’s in various departments who are encouraged to give feedback for the final report that will be sent to Jens

ACOT

- Confirmed for online meeting November 19-21
- Joint Particle Physics and Science Technology parallel session on Friday 9:45-11:45
- Reached out to YKK for program
- Response: would like to see:

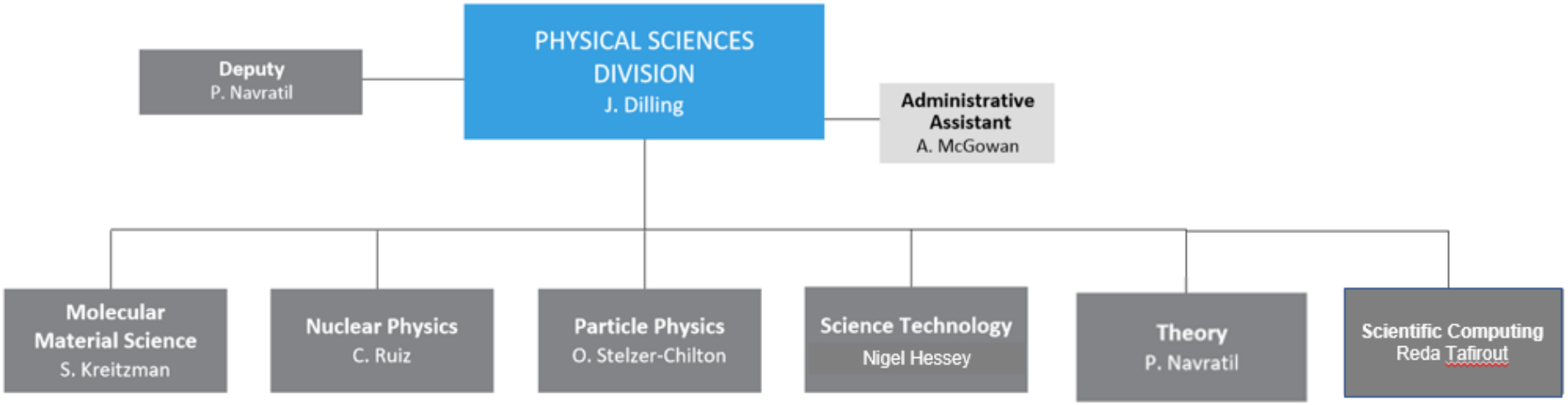
  (1) achievements since the last presentations
  (2) challenges for future
  (3) impact of the pandemic until now and future
  (4) how TRIUMF has been engaged in Canada's ongoing long term strategic planning exercise

  Please make sure that we have enough time for discussions

- Jens would like to coordinate (3) and (4) with overall TRIUMF response

Division Structure

New department – Scientific Computing
New D-Heads – Sci Tech & Sci Comp



Mitacs Globalink Research Award

Guidelines for TRIUMF applicants

Contact Reiner in case of questions

https://triumfoffice365-my.sharepoint.com/:p:/g/personal/reinerk_triumf_ca/EZKIVrUMCJVJuYWma7WU3boBhfAbhPHCDyAOnuA-05cwrg?e=8K6MMA

2020-10-22

MITACS Globalink Research Award

- The Mitacs Globalink Research Award supports Canadian-based research collaborations between Canada and select partner countries.
- Opportunities for **international senior undergraduate and graduate students, and PDFs** to come to Canada (i.e. TRIUMF) for 12–24-week research projects
- $6000 award (catered to 12-week project)
  - $4,000 from Mitacs
  - $2,000 from TRIUMF researcher's grant (in exceptional cases NRC funds)

- Agreement between TRIUMF and Mitacs: 10 awards set aside for TRIUMF

- Suggestion: for undergraduates, match to co-op program length (4 months), and financial support ~$10,000 + travel
- However, most primary opportunities with Mitacs Partners are for graduate students and postdocs

TRIUMF-MITACS MoU on Globalink Research Award - specifics

- Mitacs
  - provides research funding for up to 10 Participants in the first year of the Agreement (2020/21)
  - each Participant receives $6,000 in total funds ($4000 from Mitacs, rest via TRIUMF, typically from supervisor's grant)
  - Mitacs will confirm to TRIUMF by the end of March each year the subsequent year's allocation

- TRIUMF
  - pre-approves applications prior to being submitted to Mitacs for final review, confirming that the project is in line with TRIUMF's priority research areas and objectives and include a benefit to Canada.
  - pre-clears Inbound Participants according to TRIUMF's requirements and internal procedures.
  - ensures that at least 50% of the GRA allocation received by Mitacs be used towards applications with Mitacs international partner countries. The remainder of the allocation can be used towards Mitacs eligible countries/regions.

    (see next two slides)

Mitacs Globalink Research Award Partners

(require 50% of the 10 annual allocated stipends to be associated with these)

Country/Region	Partner	Eligibility (inbound)
Brazil	CAPES	PhD students only
France	Inria Research Centres	PhD students only from Inria Research Centres
	Université de Bordeaux École Polytechnique Université de Lorraine	Senior undergraduates, Master's, PhD students and Postdoctoral Fellows
	Université Grenoble Alpes	Senior undergraduates, Master's, PhD students and Postdoctoral Fellows
UK	UKRI	Doctoral students from UKRI funded council
Wallonie-Bruxelles	Wallonie-Bruxelles International	PhD students and Postdoctoral Fellows only from Eligible institutions: Université catholique de Louvain (UCLouvain), Université libre de Bruxelles (ULB), UniversitédeLiège(ULiège), UniversitédeMons(UMons), Université de Namur (UNamur), Université Saint-Louis – Bruxelles (USL-B)
India	Bilateral Shastri Member Institutions	Master's, PhD students, and Postdoctoral Fellows from Shastri member institutions (www.shastriinstitute.org/member-council)
	Science and Engineering Research Board (SERB)	Master's, PhD students
Korea	National Research Foundation	Master's and PhD students only, Korean citizens or PRs only
Tunisia	MedTech	Senior undergraduates, Master's and PhD students and Postdoctoral fellows
Taiwan	Global Research & Industry Alliance – National Cheng Kung University (GLORIA-NCKU)	Master's, PhD students and Postdoctoral Fellows
Ukraine	Ministry of Education & Science	Master's, PhD students and Postdoctoral Fellows

Mitacs Globalink Research Award – Other Eligible Countries/Regions
(once 50% of stipends from Partners are secured)

Country/Region	Eligibility (inbound)
Argentina	Senior undergraduates, Master's and PhD students and Postdoctoral fellows
Chile	
China	
Columbia	
EU Member States	
Iran	
Israel	
Lebanon	
Malaysia	
New Zealand	
South Africa	
Switzerland	
United States	

Specific Opportunity: UK – 3-months placement

- Now open for the third call for applications from UKRI funded doctoral students until **8 December 2020**, the UK-Canada Globalink Doctoral Exchange Scheme will support travel, living and research costs for the students in their chosen field of study. Following a competitive application process, the first exchanges will take place from April 2021.

- Students can see a **list of Canadian Professors who have registered an interest in hearing form UKRI students**. This page will be updated with new details as they are received. Students are also encouraged to make contact with other Canadian Professors who they are interested in working with. Approval from the Canadian institution is needed prior to submission, so students will need to take the necessary steps to ensure this is granted.

- Placements are financially supported by UKRI and Mitacs. Doctoral stipend and fees should continue to be paid by the research organisation throughout the three-month placement period. Students can also claim for eligible travel and accommodation costs incurred during the placement.

➔ **identify 3-months projects with UK partners & identify potential students**

Other Mitacs Programs

- See emails from RSO
- The Mitacs Accelerate Industrial Postdoc provides one, two or three years of funding — valued at $55,000 per year — for a postdoctoral fellow.
- Mitacs Elevate provides two years of postdoc funding valued at $60,000/year plus extensive customized professional development training ($7,500/year non-cash value)
- Special initiative: a thematic call for applications to the Mitacs Globalink Research Award (GRA) program in areas of strategic importance for the Canadian and international research communities: **Artificial intelligence, Quantum technologies, Green economy and Pandemic preparedness**.

- Anybody using the Darmstadt MOU for student exchange?

New Directions Workshop

- Plenary and parallel sessions

- Confirmed plenary speakers
  - Masha Baryakhtar (NYU/U of Washington)
  - Douglas Bryman (UBC/TRIUMF)
  - Timothy Chupp (University of Michigan)
  - Jens Dilling (TRIUMF)
  - Martin Hoferichter (Universität Bern)
  - Nicholas Hutzler (Caltech)
  - Oliver Kester (TRIUMF)
  - Surjeet Rajendran (Johns Hopkins University)

- Parallel session convenors organize 3h session that are summarized in the plenary
  - WG 1: physics with protons, neutrons, and deuterons/EDMs etc. & radioactive species/molecules [Adam Ritz, Beatrice Franke]
  - WG 2: new ideas with pions/muons (muonic atoms, Lepton univ, pion beta decay) [Peter Kammel, Dave Hertzog]
  - WG 3: new physics with radioactive beams [Alejandro Garcia, John Behr]
  - WG 4: electron beam opportunities [David McKeen]
  - WG 5: TRIUMF-based new physics direction [OSC, Makoto Fujiwara, Alvaro Chavarria, Gray Rybka]

TRIUMF

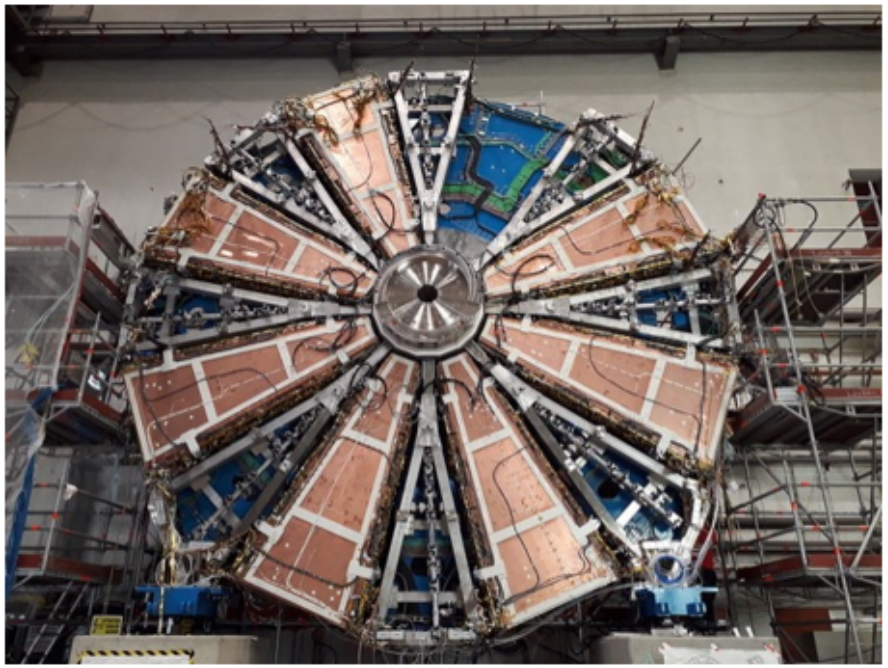
AOB

TRIUMF

Slides from SMM

ATLAS status

- By the end of this week, all sTGC half-gaps will be produced at TRIUMF
  - Will do housekeeping and keep things alive in case repairs are needed (Canadian production continues until March-April)
  - Ryan (sTGC tech) has moved to CERN for several month integration work
- All LAr baseplanes (including ones made at TRIUMF) have been replaced
  - Frontend boards of bottom crates are being reinstalled this week



First NSW with 7 small sectors up

TRIUMF

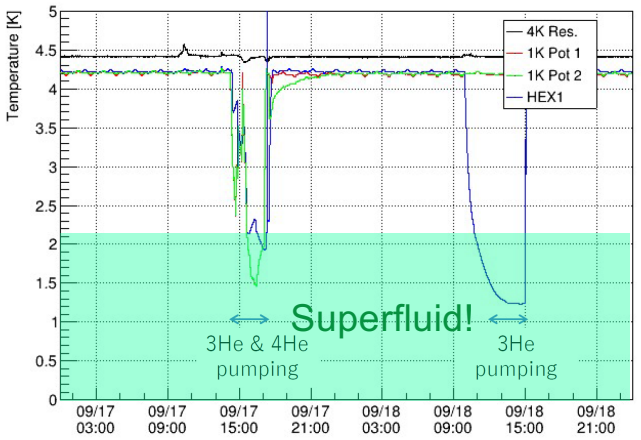
UCN updates

He Cryostat updates from KEK

- Cooldown started Sept 10
- Superfluid temperatures reached Sept 17

✓No cold or super leaks!

✓Static heat input lower than expectations.



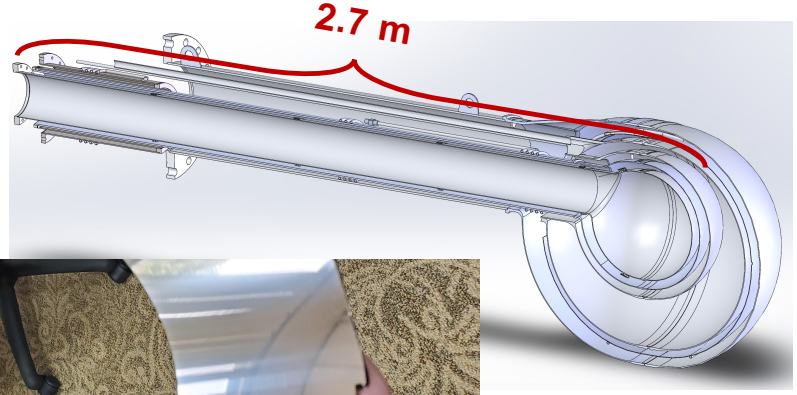
Tail section updates

- Main challenge: NiP coating of long piece necessary for UCN storage

✓Dav-Tec made satisfactory (mirror-finish) sample

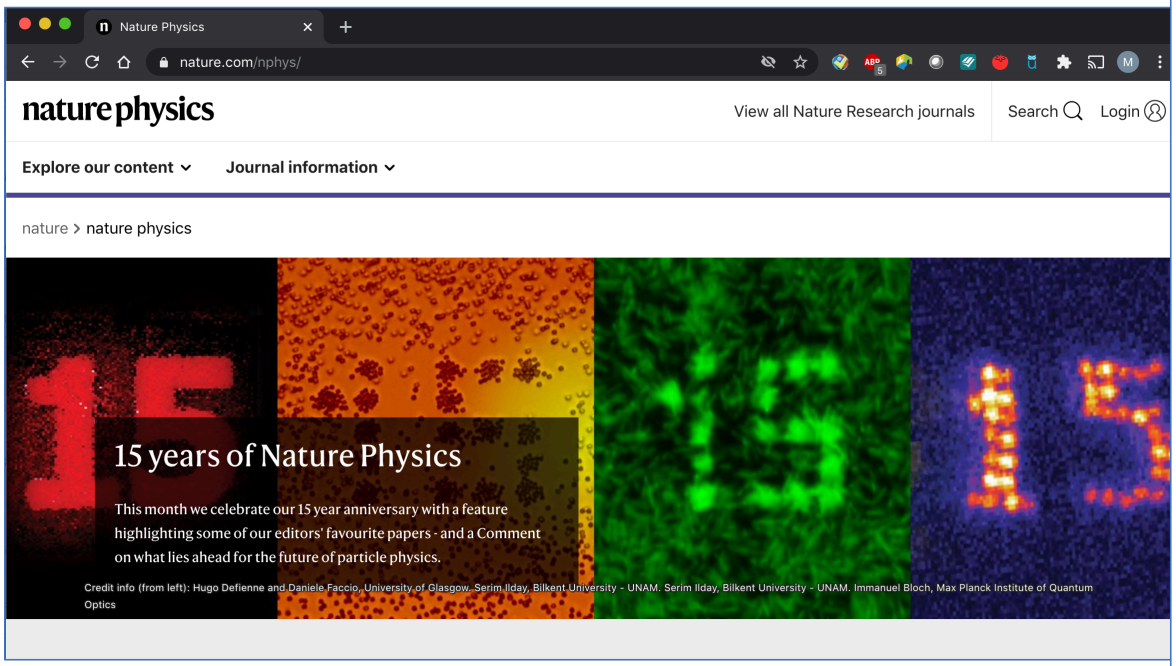
✓Ready for manufacturing!

✓LANL UCN test schedule still subject to Covid-19 uncertainty because of travel restrictions.



Particle Physics: ALPHA

- ALPHA paper from 2011 "*Confinement of antihydrogen for 1000 seconds*" has been highlighted by *Nature Physics* journal as one of the favourites in its 15 year history



Check for updates

editorial

Sweet fifteen

As *Nature Physics* turns fifteen, we celebrate some of our favourite papers.

How quickly times change. The last time we looked back at our previous achievements, in 2015, we were ten[1]. We will readily admit that nothing could quite have prepared us for the turbulent five years that we have experienced since: Brexit, Trump and the COVID-19 pandemic, to name but three prominent developments on the world stage, have all tested our naive faith in the inexorable development of our collective wellbeing.

The polarizing emotions surrounding these events have made us aware of a whole new facet of the human condition; one that, as the expert rationalizers that we are, we initially struggled to identify and come to terms with. In short: we are now teenagers, and life is more complicated than we thought.

That being said, during this time we have also been lucky to witness a number of memorable scientific discoveries. LIGO's observation of gravitational waves, the first image of a black hole obtained by the Event Horizon Telescope Collaboration, and the discovery of superconductivity in bilayer graphene would all be worthy additions to Jorge Cham's 'Top 10 physics discoveries of the past decade'[2]. It remains an exciting time as any to be a physicist.

And it is with this spirit that we have decided to mark the 15-year anniversary of *Nature Physics*. All the editors of the journal — past and present — have weighed in with their thoughts in a Feature highlighting their favourite papers from our back catalogue.

Our selection naturally reflects the breadth of our different interests as editors: for example, our launching editor, Alison Wright, focuses on our so-called front half, which under her tenure came to be a vibrant venue covering all manner of topics at the intersection between physics, art and society. Our newest recruit Richard Brierley, on the other hand, reminisces about a quantum simulation paper that inspired him as a young graduate student.

Other results that we dwell on admiringly include a 15-minute-long confinement of antihydrogen, electrons arranged in a fractal structure, and a laboratory model recreating a Parker spiral — the spiralling magnetic structure arising from the interaction between the Sun's magnetic field and the solar wind.

We celebrate these results not only for the beautiful phenomena that they uncover, but also — and this is in keeping with over 150 years of tradition at *Nature* — for the incredible feats of human ingenuity that made them observable in the first place. Indeed, if there is one recurring theme in the Feature (over and above physics, that is), it is the human touch that each one of us seems keen to share.

Our 15-year anniversary cover contains (clockwise from top left): image created by quantum imaging, self-assembly of green-fluorescent-protein-active *Escherichia coli* bacteria, a quantum gas microscopy image, and self-assembly of polystyrene beads. Credit: Hugo Defienne and Daniele Faccio, University of Glasgow (top left); Serim Ilday, Bilkent University - UNAM (top right and bottom left); Immanuel Bloch, Max Planck Institute of Quantum Optics (bottom right)

Every discovery has an interesting backstory. It might be the serendipitous nature of how it came about, or it might be the moment of realization that comes when seeing a plot, listening to a talk or just talking with somebody in the corridor — every scientist likes to recount their own. This human side of the research endeavour rarely makes it into the actual papers we publish and, arguably, it is even rarer to hear the editors' side of the story: what did they *really* think of the manuscript? What really piqued their interest?

As the contributions in the Feature hopefully show, editors are ultimately driven by a wish to champion the fields and communities at the journal, and to showcase them as widely as possible. We really aren't objective enough to be able to meaningfully claim this approach works — of course we think it does, but ultimately it's up to the readers to decide. But there is also a more subtle consequence to all this: the choices that we make inevitably mean that the editors' personality also comes through. And as a result, *Nature Physics* has a distinct personality of its own. In these days of increasing calls for everything to be data-driven, it is perhaps anathema to admit this, but there we are.

Five years ago, we wrote that "As long as it will be humans that practice science, its narrative will continue to be important. We will therefore remain focused on being a venue for the communication of the most important physics developments of the day, while at the same time fostering the appreciation that these great works of science deserve beyond their specialist communities". The physics may be changing, as is the world around us. But our mission and our enthusiasm for it remain undimmed.

Published online: 1 October 2020
https://doi.org/10.1038/s41567-020-01068-0

References

1. *Nat. Phys.* **11**, 789–790 (2015).
2. Cham, J. *Nat. Phys.* **11**, 799 (2015).

Committee Updates

- IPP/MISnomass/Snowmass
- New Initiative Planning
- Director Search
- 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

- November 12th