

December 2019 DPF Newsletter

Dear DPF members,

Please find below the monthly DPF newsletter for December 2019. This newsletter will be archived on the DPF website.

If you would like an announcement included in the January newsletter, to be sent out around January 15th, please contact the DPF Secretary/Treasurer. Please keep requests to 300 words and submit them by the **10th of the month** for consideration.

Mirjam Cvetič, Secretary/Treasurer, cvetic@physics.upenn.edu

Rick Van Kooten, Member-at-Large, rvankoot@indiana.edu

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DPF Instrumentation Awards 2019

The DPF Instrumentation Award 2019 is presented by the APS Division of Particles and Fields (DPF) to:

Hanguo Wang

For his seminal contributions to and sustained development of the use of liquid xenon and argon detectors for direct detection searches for dark matter, including the two-phase technique.

Today, liquid xenon (LXe) and liquid argon (LAr) 2-phase time-projection chambers (TPCs) are the leading technologies for direct detection searches for weakly interacting dark matter above 10 GeV, with liquid argon having competitive reach below 10 GeV. This state of affairs is in great part due to early and continued work by Wang. Wang began work on the development of LAr TPCs in the late 1980s with ICARUS at CERN, a direct precursor to the DUNE experiment. For his dissertation in the 1990s, he shifted to the study of LXe for dark matter detection, during which he made critical contributions with collaborators: observing the measurement of ionization with proportional scintillation in single-phase and proportional electroluminescence in dual-phase LXe, the latter of which critically set the basis for discrimination of electron recoils from nuclear recoils; and demonstrating the liquid purification needed to achieve the ionization drift lengths required for large detectors. A 2-kg chamber he developed for his dissertation laid the foundation for work by the ZEPLIN and XENON10 collaborations, which demonstrated leading limits on dark matter with 2-phase LXe for the first time in 2007 and 2008. Over the past 20 years, Wang has continued to be one of the technical wizards behind the fast progress in LXe and LAr detectors, developing designs for very high voltage feedthroughs, power fail-safe cryogenic systems, and low-radioactivity TPCs for the XENON100 and XENON-1T LXe and DarkSide-50 LAr detectors, which have all produced world-leading limits on dark matter. He currently is leading the cryogenics and TPC systems for the DarkSide-20k detector under construction.

The DPF Early Career Instrumentation Award 2019 is presented by the APS Division of Particles and Fields (DPF) to:

Ana Amelia Machado

and

Ettore Segreto

For the invention and development of the ARAPUCA photon detector, a novel and effective tool for measuring scintillation light in liquid argon detectors.

The greatest challenge for the detection of the VUV (127 nm) scintillation photons in a large liquid-argon volume is attenuation. An ARAPUCA consists of a small volume with highly reflective internal surfaces and acceptance windows made from short-pass dichroic filters coated with two different wavelength shifters, one on each side. The external shifter converts the 127 nm photons into photons with a wavelength below the filter's cutoff, where it is transparent. The inner wavelength shifter shifts the light to a wavelength above the cutoff where the filter is reflective. The net result of this process is that the photon is trapped inside the highly reflective box where it is detected by the photo-sensors (SiPMs) on the internal surface. The ARAPUCA named for a Brazilian bird trap, thus traps the photons and results in much more effective light collection capability than previous devices.

Snowmass Planning

The Division of Particles and Fields of the American Physical Society announces the next HEP Community Planning Exercise (a.k.a. Snowmass)

The Snowmass Community Planning Process is organized by the Division of Particles and Fields of the APS. In order to coordinate efforts across divisions, a steering committee consisting of the DPF executive committee with representatives from the executive committees of DAP, DPB, DNP, and DGRAV will meet regularly. Snowmass is an opportunity for the entire HEP community to come together to identify and document a vision for the future of particle physics in the U.S. and its international partners. Workshops will be organized over the next couple years, culminating in a 2021 summer session that pulls all the work together. Snowmass provides input to the HEPAP prioritization panel (P5), which in turn provides advice under a set of funding scenarios to the agencies on future projects and scientific programs.

Dates and Site Selection: The dates for the summer study are **July 11 - 20, 2021** and we are now considering site proposals. The deadline for submitting site proposals has passed. Plan for ~ 1000 attendees. Include the following: Names of your local organizing committee, cost and availability of lodging (mix of low- and high-end hotels, dorms or retreat center), public transportation, rough estimate of registration cost prior to any supplement provided by DOE or a private foundation, although your plans for defraying the cost can be included. Include parallel session rooms, auditorium (seats ~ 1000), coffee breaks, AV, and administrative help. Provide a rough estimate of banquet or reception costs separately. Feel free to include any special advantages of your venue. For your reference, the 2013 website is still (mostly) available at <http://www.hep.umn.edu/css2013/>

Input to the Process: Your contributions and participation will naturally occur as part of one or more working groups directed by the conveners, as well as by nominating conveners and subconveners. As we put together the process, you are also welcome to provide input and suggestions on the Slack channel and APS Engage website (these are coming soon!). You will be able to use these platforms to comment throughout the entire process from subtopics to workshop planning schedules. We are ahead of schedule when compared to the process in 2013. We aim for everyone's voice to be heard.

Sincerely, Priscilla Cushman (DPF Chair)
Young-Kee Kim (DPF Chair-elect)
Tao Han (DPF Vice-chair)

2020 DPF Election Results Announcement

Dear DPF Members,

Thank you to all who participated in the DPF election. We are grateful to all the candidates and our thanks to the Nominating Committee for selecting an outstanding slate of candidates.

Congratulations to our new Vice Chair, Joel Butler, and to our new Executive Committee Members-at-Large, Mary Bishai and Lauren Tompkins, as well as to our Early Career Member, Sara Simon.

Our deepest gratitude to our former Executive Committee Members-at-Large and Vice Chair for all their efforts.

Sincerely,

Mirjam Cvetič
DPF Secretary/Treasurer

BRN Study on HEP Detector Research and Development (R&D)

Dear Colleagues,

At the DPF meeting in Boston in August, 2019 the DOE Office of High Energy Physics (HEP) announced a Basic Research Needs (BRN) Study on HEP Detector Research and Development (R&D).

The BRN website is: [DOE-BRN-HEP-Detector-R-and-D](#)

The Detector R&D BRN Study will:

- Survey the present state of the HEP technology landscape.
- Identify key capabilities and associated performance requirements to enable HEP science drivers.
- Identify technologies to provide or enhance such capabilities.
- Articulate long-term Priority Research Directions to push well beyond the current state of the art, potentially leading to transformative technological advances with broad-ranging applicability; flesh out the required R&D efforts with deliverables with notional timelines and key technical milestones along the way; and elucidate the technical infrastructure required to support these efforts.
- Formulate a small set of instrumentation Key Challenges that could, if addressed successfully, result in game-changing experimental capabilities.

The BRN Study structure consists of five “physics working groups” based on the five P5 science drivers: the Higgs as a tool for discovery, the physics of neutrino mass, the new physics of dark matter, cosmic acceleration: inflation and dark energy, and exploring the unknown: new particles, new interactions and physical principles; and seven “technology working groups”: Quantum Sensors, Solid State (including vertexing and tracking), Calorimetry, Photodetectors, Noble Liquids, TDAQ (including Machine Learning), and Readout & ASICs. There is also a cross-cutting group. Each working group is led by two conveners. In addition to the conveners, the physics groups have two members and the technology groups have four members.

A hallmark of the BRN Study will be very close interaction between the physics and technology groups and with the HEP community. The initial community input to the BRN Study is the DPF Coordinating Panel on Advanced Detectors 2018 Report “New Technologies for Discovery” [CPAD-Report-2019](#) . Following on from this, most BRN working groups have identified a number of expert associate members and all working groups are engaging in outreach to the relevant communities.

The Conveners of the BRN Study are:

- The Higgs as a tool for discovery: Jim Hirschauer (FNAL) Gabriella Sciolla (Brandeis)
- The physics of neutrino mass: Ornella Palamara (FNAL) Kate Scholberg (Duke)
- The new physics of dark matter: Jodi Cooley (SMU) Dan McKinsey (Berkeley)
- Cosmic Acceleration: inflation and dark energy: Clarence Chang (ANL) Brenna Flaugher (FNAL)
- Exploring the unknown: new particles, new interactions and physical principles: Sarah Demers (Yale) Monica Pepe Altarelli (CERN)
- Quantum Sensors: Andy Gercai (Northwestern) Kent Irwin (Stanford)
- Noble Liquids: Roxanne Guenette (Harvard) Jocelyn Monroe (RHUL)
- Calorimetry: Francesco Lanni (BNL) Roger Rusack (Minnesota)
- Solid State (tracking and vertexing): Marina Artuso (Syracuse) Carl Haber (LBNL)
- Photodetectors: Lindley Winslow (MIT) Peter Krizan (Jožef Stefan Institute)
- TDAQ: Darin Acosta (Florida) Tulika Bose (Wisconsin)
- Readout and ASICs: Gabriella Carini (BNL) Mitch Newcomer (Penn)
- Cross Cut: Marcel Demarteau (ORNL) Abe Seiden (UCSC)

The Chairs of the BRN Study are:

Bonnie Fleming (Yale), Ian Shipsey (Oxford)

The DOE BRN Study liaisons are:

Glen Crawford (DOE), Helmut Marsiske (DOE)

The end product of the BRN Study will be a report due at the end of February 2020. The report will take its final shape at a BRN Workshop that will be held December 11-14, 2019 in the DC area. This workshop will be attended by all BRN Study members plus a number of observers: DOE Program Managers from HEP and related programs, and from NSF. The plenary talks on the first day will be streamed to the community.

In September we began regular telecons to conduct the ground work for a productive and conclusive workshop in December which will lead to a report that is a crisp and compelling articulation of the essential enabling power of instrumentation to deliver the US High Energy Physics program in a global context over the next twenty years.

The BRN website contains the email addresses of the conveners and co-chairs and we encourage you to contact any convener or the co-chairs if you have comments, ideas, suggestions or questions. The website also contains portals to communicate with the BRN Study.

In addition, many BRN Study members will attend the [CPAD Workshop](#) in Madison, Wisconsin December 8-10, 2019 [CPAD-Madison-2019](#) where there will be townhalls and other fora for community input and dialog with the BRN process.

The BRN Study is looking forward to hearing from you.

Bonnie Fleming & Ian Shipsey

BRN Study Co-Chairs

Glen Crawford & Helmut Marsiske

DOE Liaisons

Ozaki Exchange Program

Deadline **20 December, 2019**

Ozaki Exchange Program, funded jointly by the U.S. and Japan, was established in 2018 to strengthen U.S.-Japan scientific collaboration and to facilitate greater cooperation in the areas of accelerator and particle physics by supporting the exchange of graduate students between Japan and the United States. All graduate students enrolled, or undergraduate students already accepted for enrollment, in accredited Japanese or U.S. physics Ph.D. programs are eligible to apply. 4 US students and 2 Japanese students were awarded in 2019. The deadline for applications will be December 20, 2019. For more details, please visit <https://www.bnl.gov/ozaki/>.

Conference on Neutrino and Nuclear Physics 2020 (CNNP2020)

24-28 February 2019

Abstract Deadline: 30 October, 2019 - Passed

Opening of registration & Abstracts extension

The International Conference on Neutrino and Nuclear Physics 2020 (CNNP2020) is the second in the CNNP series and will be held from 24-28 February 2020 in South Africa, hosted by iThemba LABS. This conference will bring the nuclear and neutrino communities together in order to exchange ideas and results and build on the very successful inaugural CNNP conference held in Catania, Italy, in October 2017.

We are pleased to announce that the registration process for CNNP2020 opened on 1 October 2019. Furthermore, please note that the period for abstract submissions has passed.

For more information, including the list of confirmed invited speakers, please visit <https://indico.tlabs.ac.za/event/85/> or contact us at cnp2020@tlabs.ac.za.

Local Organizing Committee, CNNP2020

Instrumentation for Colliding Beam Physics (INSTR20)

24-28 February, 2020

Registration deadline: **13 January, 2020**

Dear colleague,

We are pleased to inform you that the Conference "Instrumentation for Colliding Beam Physics" (INSTR20) will be jointly organized by the Budker Institute of Nuclear Physics and Novosibirsk State University and held in the Budker Institute, Novosibirsk, Russia in the period from 24 to 28 February, 2020.

Registration is already opened on the website: <http://instr20.inp.nsk.su>

You are kindly invited to participate and register at your earliest convenience. Please also inform all potentially interested colleagues and encourage them to register.

Looking forward to meeting you in Novosibirsk in February 2020.

Organizing Committee

IUPAP C11 Young Scientist Prize 2020

Open for Nominations – **Deadline: 1 February, 2020**

The Commission on Particles and Fields (C11) of IUPAP solicits nominations of outstanding young experimental or theoretical particle physicists for the two 2020 Young Scientists Prizes. The prizes, each consisting of an IUPAP medal and a cash (€1000) award, will be presented at the 39th International Conference on High Energy Physics, Prague, Czech Republic on July 30 – August 5, 2020.

Candidates for the prize should have a maximum of 8 years of research experience (excluding career interruptions) following the PhD.

Nominations for the IUPAP Particles and Fields Young Scientist Prize:

- can be made by experimental or theoretical particle physicists who know the work of the nominee well and include a citation statement
- should consist of a minimum of two and a maximum of three letters explaining the nominee's qualifications and scientific achievements, a complete CV and a list of publications.

The nominator should collect materials, including reference letters, and upload them using the site: <https://indico.cern.ch/e/c11-ysp-2020>.

Note: Nominations are tied to a unique nominator e-mail in the system. Should a nominator wish to propose additional candidates, please be aware that a different e-mail address would be needed for each nomination.

Additional information is available at <https://iupap.org/commissions/c11-particles-and-fields/c11-news/>.

All material should be submitted before **February 1, 2020 at 12:00pm CET**.

Heidi Schellman and Florencia Canelli, Chair and Secretary of IUPAP-C11