HOLIDAY 2022 ISSUE NO. 2

The Beam Pulse

The latest highlights in Accelerator Directorate

Happy Holidays!

The Program and Project Support Office (PPSO) is excited to share this holiday double issue of *The Beam Pulse*! The first issue was received with enthusiasm and praise and the PPSO is thankful for the content recommendations being made from across the organization. The people of AD are clearly invested in sharing the efforts and successes of their colleagues as well as their own, and that's the connection we aim to foster not only with this newsletter but with our practices.

Wishing everyone peace and joy,

Alyssa Miller, Noel Wiedman, Richard Wallace; PPSO

Find us online: ***ad.fnal.gov/hq/PPSO***

AD holiday service interruptions

Beam to experiments:	Uptime may be reduced.
PIP-II Support:	AD lead work may slow.
LBNF Support:	AD lead work may slow.
FAST/IOTA:	No impact.
Facility management:	It will take time to call in experts.
ACORN:	No impact.

See the labwide schedule of expected service impacts in *Fermi News*

No call-in zone: Dec 24, 12a - Dec 26, 8a

Inside this issue:

Thank you to everyone who submitted holiday celebration photos - you're all so good at smiling!

Dec 23: Christmas Eve observation (lab holiday, 12p)

Dec 23 - Jan 2: Voluntary winter break

Dec 24: Christmas Eve

Dec 25: Christmas Day

Dec 26: Christmas observation (lab holiday)

Dec 30: New Year's Eve observation (lab holiday, 12p)

Dec 31: New Year's Eve

Jan 1: New Year's Day

Jan 2: New Year's Day observed (lab holiday)

Jan 3 - 27: African American Black Association (AABA) coat drive for Family Focus, Aurora
Donations @ WH Ramsey Auditorium & 2nd Floor Crossover
Ask Anahi Ruiz Beltran (anahirb@fnal.gov) for more info

Jan 8: Ask A Scientist
Zoom, 1p

Jan 16: Martin Luther King, Jr. Day (lab holiday)

Jan 22: Lunar New Year

Jan 21: AABA food bank volunteering opportunity
Northern Illinois Food Bank, 9a-12p
Ask Anahi Ruiz Beltran (anahirb@fnal.gov) for more info
Register here

 Photo credit: Clay Leonard

Fermilab

AD Workforce

Work anniversaries

DECEMBER 2022 • Robert Ainsworth (8) • Diala Al Shamasneh (1) • Kris Anderson (33) • Allen Bujak (2) • Gregory Bulat (22) • Cervando Castro (34) • Jennifer Chikelu (3) • Eric Claypool (13) • **Kevin Duel (15)** • Denise Finstrom (26) • **Keith Gollwitzer (25)** • David Ifversen (38) • Daniel Jones (2) • Margaret Jones (37) • Patrick Karns (23) • Ronald Kellett (38) • **Lisa Lopez (40)** • Owen Marshall (14) • David Neuffer (26) • Aleksandr Romanov (8) • **David Slimmer (40)** • David Vander Meulen (29) • Joseph Walano (1) • James Williams (24) • Robert Zwaska (17) • **JANUARY 2023** • Keith Anderson (17) • Jeremy Arnold (12) • Paul Bainbridge (8) • Erik Barbere (1) • Sujit Bidhar (7) • Jean-Paul Carneiro (18) • Zuxing Chen (26) • Bradley Claypool (42) • Jason Crnkovic (1) • Noah Curfman (4) • George Deinlein (9) • John Devoy (33) • Andrew Feld (21) • Beau Harrison (12) • David Holeman (2) • Chris Jensen (33) • **Stanley Johnson (35)** • John Johnstone (32) • **Walter Kissel (50)** • Daniel Klepec (34) • Yuriy Koval (1) • Dakota Krokosz (1) • Meredith Lee (3) • Susan McGimpsey (24) • Erik Medina (4) • Larry Mills (2) • Patrick Minton (2) • Maxwell Monningh (33) • Richard Neswold (28) • Irina Novitski (17) • Peter Prieto (34) • Craig Rogers (42) • Don Rohde (49) • Nathan Ruffatti (4) • James Santucci (29) • Philip Schlabach (27) • Shyamala Shanmugasundaram (2) • Patrick Sheahan (39) • Jeffrey Simmons (32) • **Roshanda Spillers-Nowlin (25)** • John Stanton (1) • Dean Still (33) • Travante Thompson (4) • Johnathan Walters (23) • George Willms (4) • Katsuya Yonehara (17)

New hires

Darryl Marshall,
EE Support Department

Jonathan Williams,
Target Systems Department

2022 retirees

Thanks to all who retired this year and who plan to retire for their extended contribution to the lab's mission and their dedication to AD!

Chuck Bair (23) • Kermit Carlson (33) • Philip Crabtree (24) • Paul Czarapata (50) • Mark Dilday (23) • Richard Divelbiss (49) • Steven Hays (45) • Dallas Heikkinen (37) • Brian Hendricks (42) • Jeneen Irvin (47) • Glenn Johnson (33) • Rebecca Johnson (15) • Chris Kelly (43) • Gordon Koizumi (47) • Michael Lindgren (14) William Marsh (41) • Jeffrey Meisner (42) • Terrence Morrison (40) • Wesley Mueller (40) • James Patrick (39) • James Ranson (45) • Greg Saewert (45) • Greg Vogel (33)

 Photo credit: Evan Milton

The Big Picture: SBND Move

On Thursday, Dec. 1, **the Short Baseline Near Detector (SBND) was moved from the D-Zero Assembly Building (DAB) to its final home downstream of AD'S Booster Neutrino Beamline (BNB)**. SBND is a Liquid Argon Time Projection Chamber (LArTPC) designed to detect neutrino interactions. The strength of this detection technology is its bubble-chamber-like spatial resolution and therefore to detect neutrino properties such as their flavor.

The detector was constructed over the last couple of years at DAB, which provided the space to receive, test and assemble the different sub-systems before installing them in a custom-designed steel-frame that would later also serve the transport of the detector. It consists of a central cathode and two anode wire planes, a field cage surrounding the detector volume, cold electronics to readout the deposited and drifted charge created by secondary particles in neutrino interactions, and photon detection system to observe scintillation light.

After completion of its assembly, the detector was moved to the Short Baseline Near Detector Building on Neutrino Campus, located about 110m downstream of the BNB target.

Over the coming months, the SBND team will complete the installation of the detector inside the cryostat, and commissioning is expected to begin later in 2023. **The detector is looking forward to receiving beam from BNB and performing a multitude of analyses**: in addition to a joint neutrino oscillation analysis with the SBN far detector (aka ICARUS), SBND with its close proximity to the beam target will have a large-statistics cross section program and search for anomalies beyond the Standard Model of particle physics in the neutrino sector.

Anne Schukraft; Neutrino Division: SBN Project

"The detector and transport frame together build a 20ft cube and weigh 65,000 lbs."

The challenge of the 3-mile transport across Fermilab site included moving the detector out the DAB ramp on steel tracks with just an inch of clearance to the garage door opening, lifting it onto a trailer with a mobile 200ton crane, and driving it at 2.5 mph over Main Ring Rd. to Neutrino Campus. There, the detector was unloaded with the same crane, and pushed into the building again on steel tracks.

Thanks to detailed planning and the effort of many Fermilab teams, the transport went very smoothly.

"AD External Beam Delivery Department and Accelerator Controls Department installed timing devices, provided key accelerator signals over fiber communication to SBN-ND in 2017, and more recently helped with their control and configuration. SBND has been using AD beam to commission the data acquisition (DAQ) and trigger systems since March 2022."

 Photo credit: Ohana Rodrigues

A word from Safety

Q&A with Ben Russell, Radiation Safety Officer

How do AD and the RSOs interface?

Radiation Safety Officers (RSOs) are basically the Division Safety Officers (DSOs) specifically for ionizing radiation safety. We review jobs to assess and reduce radiation exposure, generate permits to allow work in radiologically controlled areas, and authorize access to areas considered "higher risk." We use a variety of tools to monitor work such as the AD Worklist, IMPACT, the 9 AM Ops meetings, Radiological Control Technicians (RCTs) in the field, and discussions with Department Heads and/or Group Leaders in the field. RSOs also ensure we are in compliance with all rules, regulations, orders, etc. that we have been directed to follow.

Check out the *ES&H RSO assignments*!

What does it take to become certified as an RSO?

There are different levels of RSOs, based on experience, education, and overall knowledge of radiation safety and accelerator safety. A baseline degree in radiation safety or a similar degree is normally required, although there are exceptions for different experience in radiation safety. Once an RSO is hired, we complete a checklist of training and qualifications to ensure we are ready to handle the responsibilities of being an RSO.

What does having two new RSOs mean for AD and ES&H?

Having two new RSOs in the Environment, Safety & Health Division (ES&H) greatly increases the availability to assess work, answer emails/phone calls, and generally provide a higher degree of support for our assigned areas. Currently the Radiation Safety Program is going through major changes which has impacted our ability to provide necessary support, so the additional RSOs alleviate some of that burden. We are also in the process of hiring three more RSOs, which will allow us to move on from just compliance to have a robust and meaningful Radiation Safety Program.

Ben Russell; ES&H Radiation Physics Operation: RSO

 Photo credit: Carl Lundberg

The Machine Report

A fast ramp to full power

Although accelerator operations were significantly delayed by major electrical projects impacted by supply-chain shortages, the following week the machines came together to rapidly commission nominal beam flux for NuMI and Muon Campus programs, an effort which has taken over a month in previous years. Despite a recent NuMI horn failure, beam operations are currently projected to reach or exceed their proton delivery objectives for the run in the NuMI, Muon, and BNB programs.

Since the delivery of the first protons of this run the Main Injector Department has developed and successfully commissioned a magnet ramp period of 1.133 seconds, shortened from 1.2 seconds. Main Injector continues to deliver beam on a 1.2 or 1.4 second cycle, but the shortened magnet ramp lays the groundwork for future power increases to the long baseline neutrino program.

In addition, the Booster group successfully commissioned a new longitudinal digital RF damper system that is especially helpful for running high-intensity beam, a key area of focus for PIP-II era Booster operations.

AD Run Coordinators
Jeff Eldred; Proton Source Department: Physics
Nino Chelidze; Main Injector Department: Engineering Physics Group

Despite delays, beam to IOTA!

FAST and IOTA have struggled during Run 4 to return to the operational state where the nonlinear integrable optics (NIO) studies in IOTA can continue, but machine downtime has provided an opportunity to advance the installation of the FAST-GREENS experiment to be conducted in collaboration with University of California, Los Angeles (UCLA).

Electrical Engineering Support and cryogenics and infrastructure experts have been challenged but very helpful with FAST/IOTA issues, which recently included FAST electron gun issues, cryogenic instabilities and a cooling water main break. Happily, there seems to be a light at the end of their accelerator tunnel: on Wednesday, Dec. 14 the water main break was fixed and they were finally able to put beam into IOTA after weeks of being down.

Commissioning the NIO is crucial to enabling high intensity beam delivery from circular synchrotron accelerators across high energy particle physics programs. Once NIO studies are complete FAST will concentrate on several linac experiments in collaboration with institutions such as Argonne National Laboratory, UCLA and Northern Illinois University.

Jamie Santucci; FAST Facility Department

 Photo credit: Daniel MacLean

AD Spotlight

Season's greetings from TSD!

On Dec. 1, the Fermilab Accelerator Directorate's Target Systems Department (TSD) hosted a 2022 holiday multicultural potluck in the Booster Tower West (BTW) Penthouse/Grotto. The participants were invited to share their cultural holiday traditions and bring their signature dishes to represent the cultural diversity of the TSD community.

The day before the event, a group of volunteers led by our wonderful TSD admin Kim Henley had fun decorating the rooms. **The area acquired a warm ambiance ready for a festive family gathering.** Posters depicting holiday traditions of the TSD's culturally diverse community were arranged on the walls, colorful holiday lights, shiny foil spirals and the imaginary yet almost palpable warmth of the digital fireplace set the holiday mood.

"It was heartwarming to see everyone enjoying each other's company. Thank you for sharing the foods and your culture, your presence, your smiles, the conversations, **the enthusiasm that our TSD members showed in the event preparation and participation brings us a strong sense of community**. I am grateful to be a part of this community."
Yun He; TSD Engineering

"I just wanted to show my appreciation for making us new folk feel welcome and part of the team! I've only been at the lab for about two months, but it feels like I've been here much longer!"
Adrian Orea; TSD Engineering Operations

Dali Georgobiani, TSD MARS

See photos on the *event SharePoint page* and read more in the *Fermilab at Work news release*.

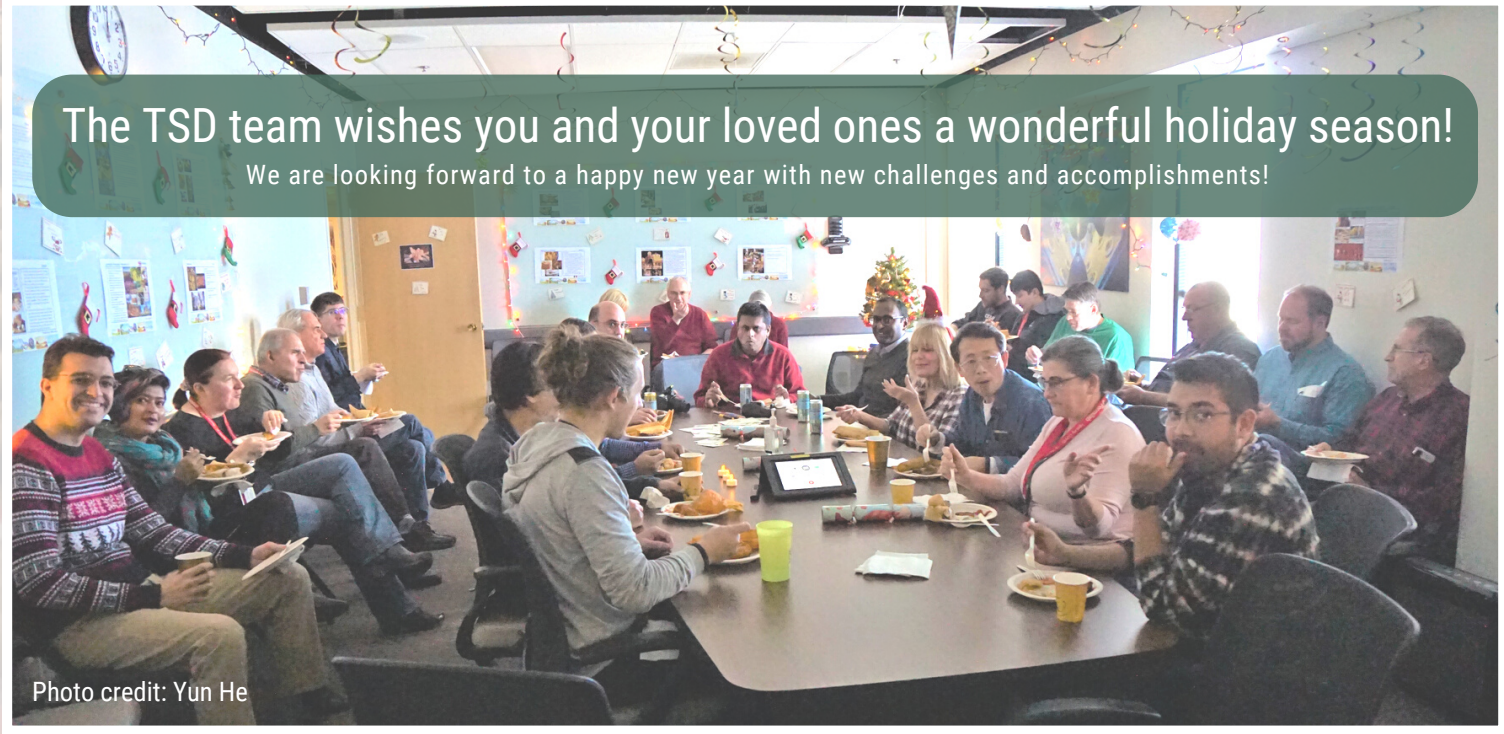


Photo credit: Yun He

 Photo credit: Yun He

Mechanical Support Department @ Pal Joey's

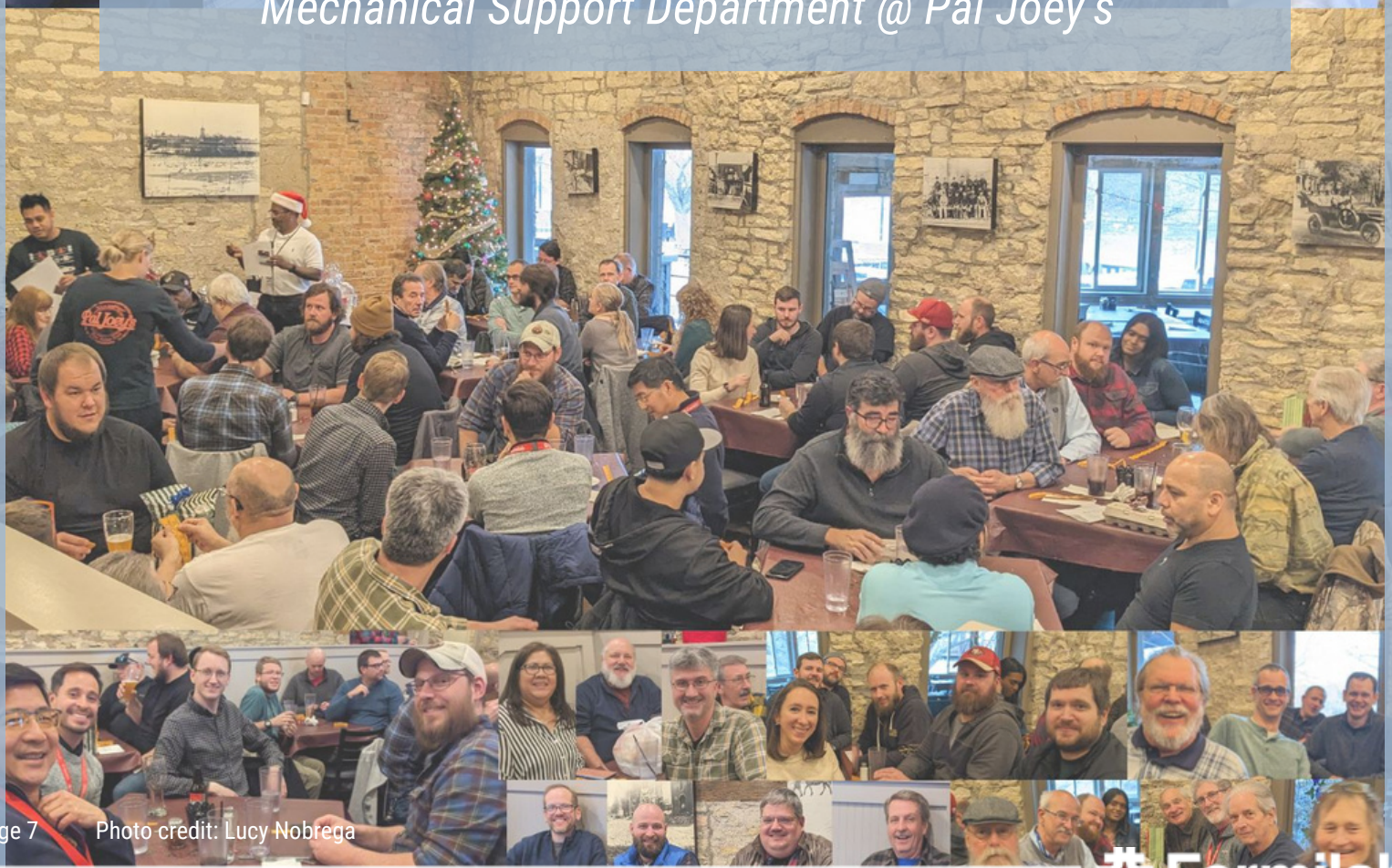
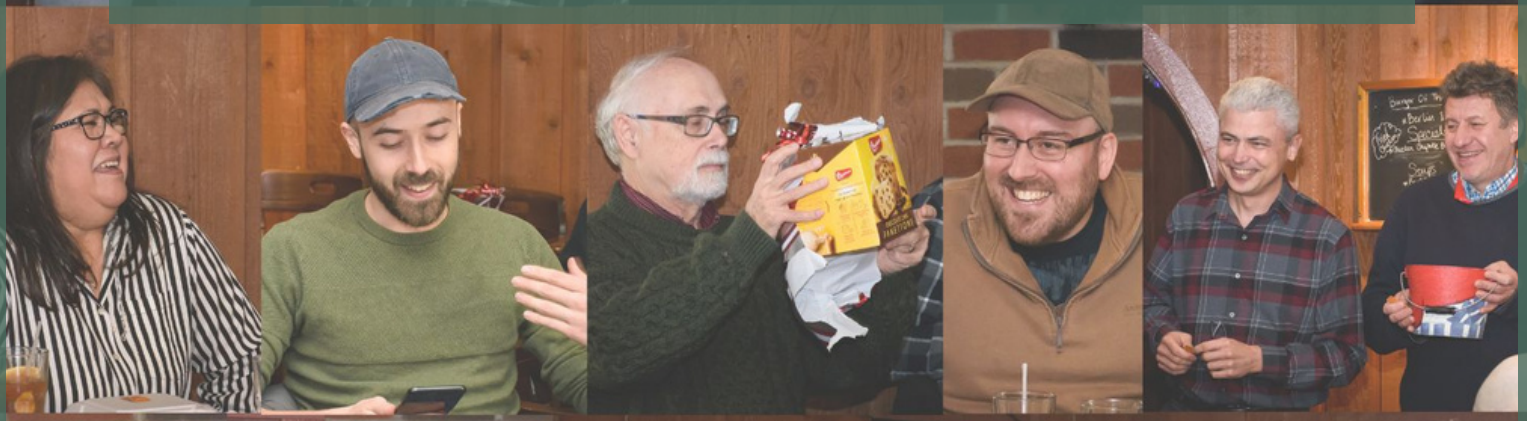


 Photo credit: Lucy Nobrega

Accelerator Research Division @ Country House



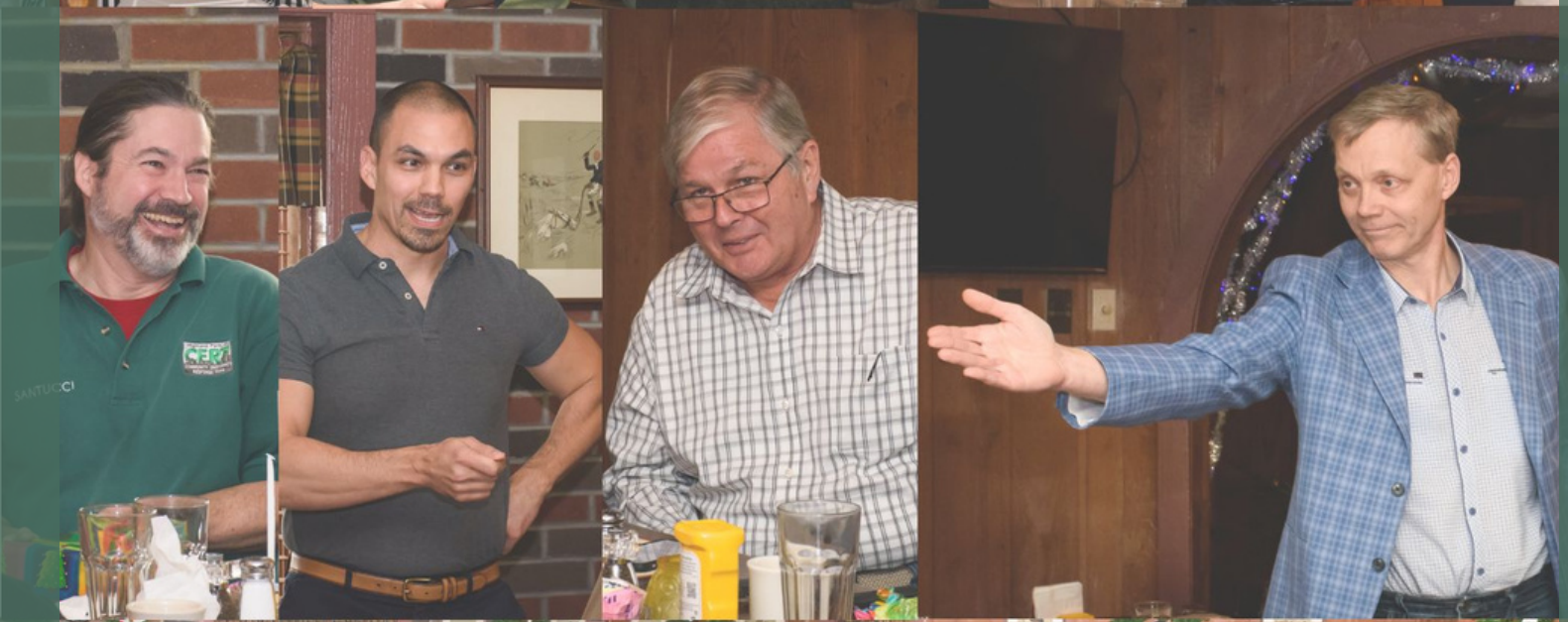


Photo credit: Giulio Stancari

Proton Source Department @ WindMill Grille & Pizzeria

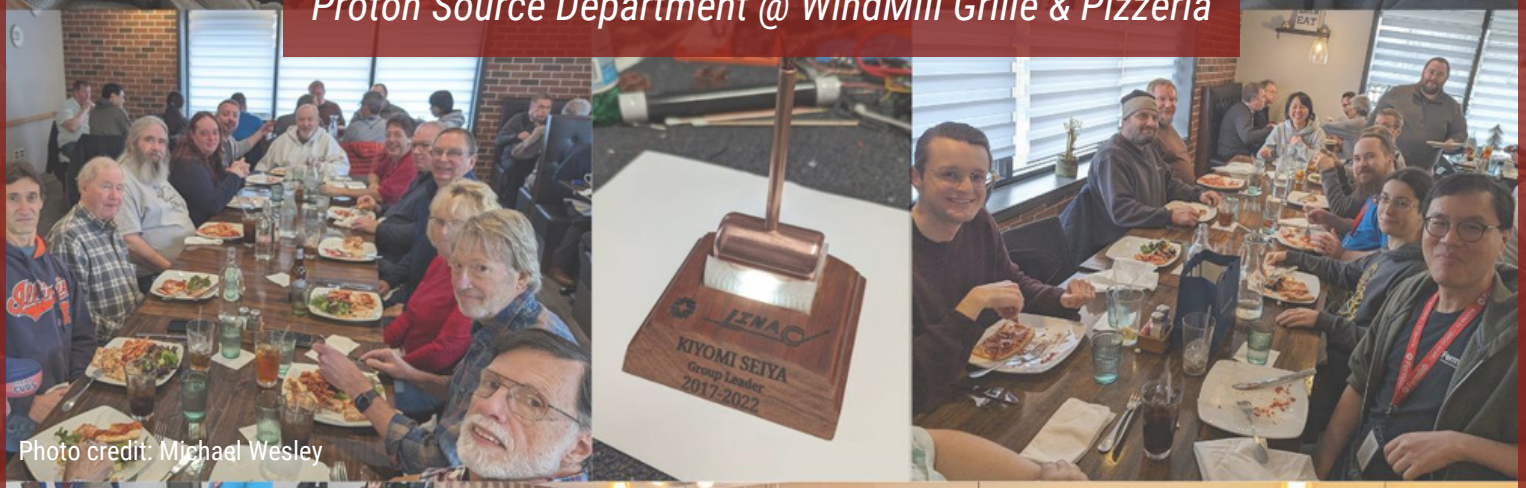


Photo credit: Michael Wesley

Accelerator Operations Department Potluck

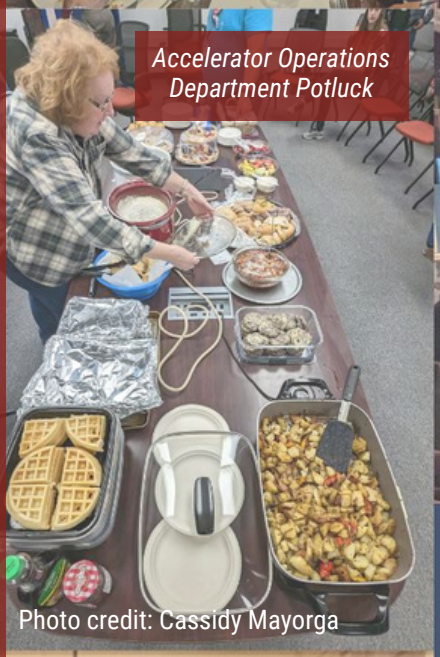


Photo credit: Cassidy Mayorga

Main Injector Department @ Rock Bottom Brewery

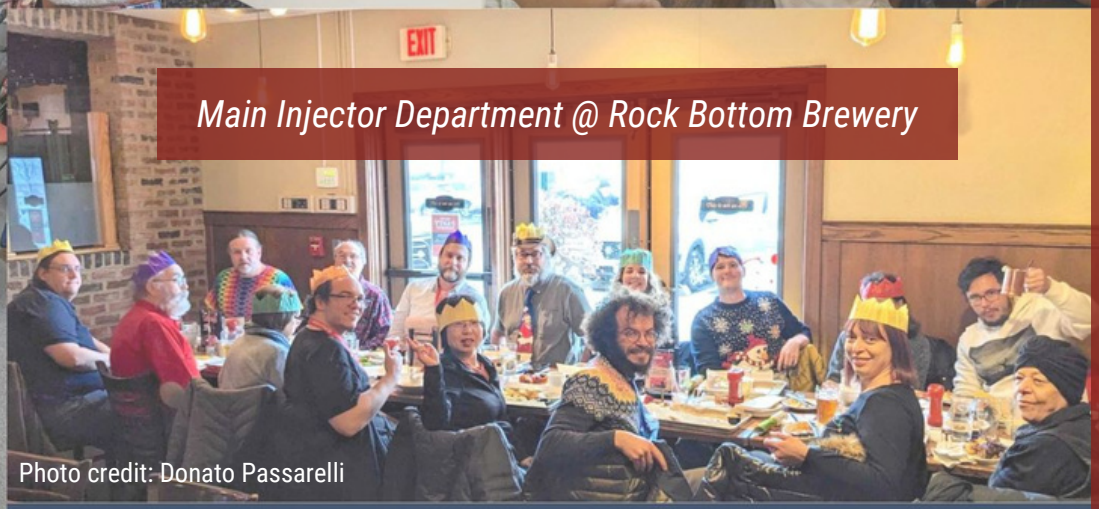


Photo credit: Donato Passarelli

Program & Project Support Office @ Cooper's Hawk Winery

Photo credit: Noel Wiedman

Thanks to all who plan and organize!

Accelerator Directorate is grateful to all who have hosted department gatherings during this holidays season and in seasons past. This time of year can be stressful for many and lonely for more than we know. Celebrating with the people we care about and reflecting on our achievements no matter how great or small is crucial for growth as professionals and as people. Thank you for giving us the opportunities to put our work and lives in perspective and strengthen our community the best way we know how!