1Q 2018 Newsletter

An Official Publication of the Health Physics Society's Accelerator Section

"From the President"

Vashek Vylet, vylet@jlab.org
Jefferson Lab

I am happy to report that we will have a busy Accelerator Section Session at the HPS Annual meeting in Cleveland. The session is scheduled for the morning of Tuesday, July 17. The session TAM-E will be in Room 6, between 8:00 – 12:00. We have 10 presentations that will last till 11:00 AM, leaving only one hour for the Section Board of Directors meeting, the Section Plenary meeting, and Student Awards. On this last topic, it is not clear whether any of the 10 abstracts qualify as student work. After communication with the HPS secretariat, I have obtained access to abstracts for all oral sessions and posters, and I am currently scanning them to see if any other student work in there is related to accelerator health physics topics. If you know of such work that would qualify, please let me know.

As every year, this is the time to request nominations for Section Officers. Last fall I have asked Elaine Marshall to chair the Accelerator Section Nominations and Elections Committee and to select two additional members. I hope there will be a strong response to her message.

HPS 63rd Annual Meeting

Cleveland, Ohio
July 15-19, 2018

Accelerator Section Session
Tuesday July 17

Link to webpage for more information.

"Section Nominations"

Elaine Marshall, etmarsh@sandia.gov
Sandia National Laboratories

At the annual business meeting of the Section, the membership will have the opportunity to elect new officers to the positions of Director, Newsletter Editor, Secretary, and President-Elect. Serving as an officer of the Section is one of the greatest ways to understand the contributions of the Section to the national society and to meet other Section members and individuals with an interest in accelerator health physics.

It is one of the easiest ways to get involved and learn about all of the different opportunities for career and personal development, mentor others, and hear of the technical advances within the accelerator health physics community.

The only requirements are that the individual is a member of the national HPS as well as a Section member, in good standing.

This year, the Nominating Committee is being chaired by Elaine Marshall (etmarsh@sandia.gov) with Patrick Bragg (braggpatrick@ymail.com) and Johannes Bauer (bauerj@slac.stanford.edu) volunteering their service.

Please submit names to any of the committee members prior to June 1st for consideration.

"Glimpse of Radiation Protection for LCLS-II/HE at SLAC"

Mario Santana Leitner,
msantana@slac.stanford.edu
SLAC National Accelerator Laboratory

The LCLS-II facility at SLAC is quickly moving from design to construction with many exciting activities taking place and last steps for preparation ongoing.

The installation of the injector for the new superconducting machine is near completion and SLAC's Radiation Protection Group is ensuring all safety elements are in place, including the procedures and necessary documentation for Accelerator Readiness. Meanwhile, radiation test and survey procedures have been created for safe handling of the cryomodules, which are beginning to arrive from partner laboratories FNAL and JLAB. In addition, large shielding caps are being installed within the klystron gallery over the vertical shafts to the Linac. At the lower part of some of these penetrations, sealed plates have been installed to prevent future excessive activated air exchanges between Linac and Klystron Gallery above, while computational fluid dynamics modeling have just been finalized.

In December, a year-long shut-down of LCLS-I will allow for major upgrades. These upgrades include D&D of the LCLS kW beam dumps and replacement of those by the LCLS-II high-power dumps, which are under the last fabrication steps at SLAC mechanical shops. In those shops, shielding for halo collimators have also already been fabricated.

Commissioning planning is also under way, and several new devices for the sophisticated Beam Containment System of LCLS-II such as optical fibers and diamond detectors are being tested at various facilities. Radiation physics is finalizing the implementation in Monte Carlo codes of the response of these devices to radiation to devise optimum commissioning settings and detectors configurations.

As all these efforts take place, design for the upgrade of this machine, i.e. LCLSII-HE, is already underway, with the CD1 milestone approaching in June 2018. Until its expected completion in 2028, a few major challenges will need to be resolved such as how to handle the expected exponential rise of field emission for cryomodules operated at gradients well above those of LCLS-II.

U.S. Particle Accelerator School

"Radiation Physics, Regulation and Management"

East Lansing, Michigan
June 11-15, 2018

Instructors:
J. Donald Cossairt and Matthew Quinn, Fermilab

Link to webpage for more information.

"News from Jefferson Lab"

Vashek Vylet, vylet@jlab.org
Jefferson Lab

Looking towards the future, Jefferson Lab is proposing and hoping to build an electron-ion collider (EIC) on its site. Such a project has been recognized as one of the priorities by the Nuclear Science Advisory Committee (NSAC), and a National Academy of Science report on this topic is currently under review with publication in a few months. It is expected that the report will be encouraging, and construction will be approved and funded by DOE.

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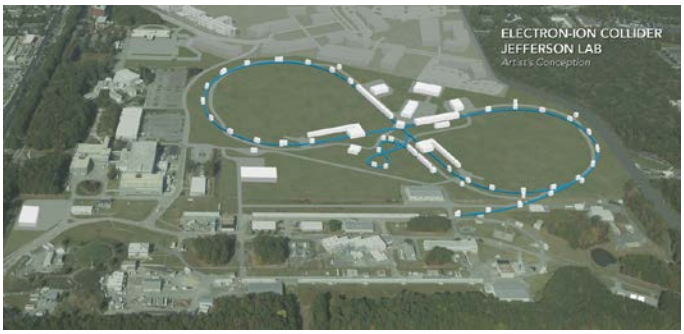

Figure 1: Aerial view of Jefferson Lab with an artist rendition of the proposed collider complex.

Jefferson Lab project, JLEIC, is in competition with a similar project at BNL, e-RHIC, envisioned at Brookhaven's Relativistic Heavy Ion Collider. Due to limited resources, BNL and JLab are collaborating on specific aspects of the collider project.

A collaboration meeting was recently held at Jeffferson Lab on March 26–28, with the aim to identify tasks that need to be completed to prepare a pre-Conceptual Design Report 0 (pCDR0) by the end of August this year. We (the Radiation Control Department) will be busy completing key preliminary assessments relevant to radiation and environmental safety by this deadline. The JLEIC project proposes to use the existing 12 GeV CEBAF electron accelerator as the electron injector to the collider ring shaped in a "figure 8" – see the attached figures. As is apparent from Figure 1, the accelerator complex would be surrounded by a busy metropolitan area. The collider would be built underground, at about the same depth underground as CEBAF.

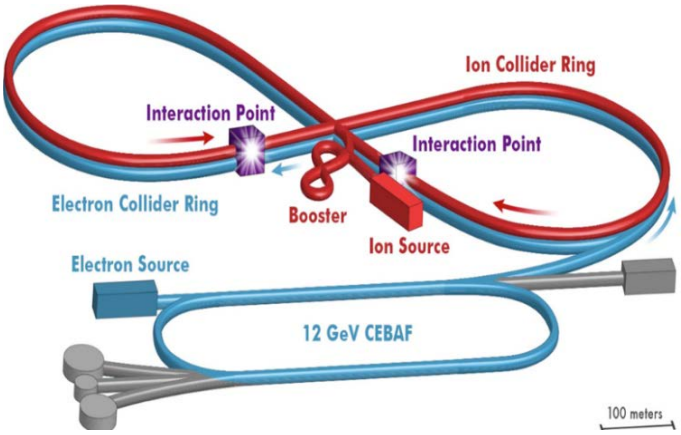

Figure 2: Schematic layout of the envisioned JLEIC accelerator complex.

"Announcement from CEBAF"

Bob May, may@jlab.org
Jefferson Lab

Just months after completing a nine-year construction project to upgrade its research capabilities, the Department of Energy's Thomas Jefferson National Accelerator Facility has delivered its next technological success: For the first time, the Continuous Electron Beam Accelerator Facility (CEBAF) has delivered electron beams simultaneously to all four experimental halls. This achievement maximizes the amount of research that can be accomplished during run times and paves the way for the next era of ground-breaking experiments at the lab.

In September, Jefferson Lab officially completed the $338 million construction project to upgrade CEBAF's research capabilities from 6 GeV to 12 GeV and add a new experimental hall. Originally, the laboratory envisioned delivering electron beams to up to three of its four experimental halls simultaneously upon completion of the upgrade.

It wasn't thought to be technologically feasible to provide beam to all four halls, however while the upgrade was in progress, Jefferson Lab staff made technological advances in equipment and accelerator capability, opening the door to providing additional research capacity.

On Jan. 12 at 8:04 p.m., CEBAF began delivering beam to all four experimental areas.

According to Rolf Ent, Jefferson Lab's Associate Director for Experimental Nuclear Physics, the accomplishment opens the possibility of CEBAF, an Office of Science User Facility, to deliver electron beams for an even richer program of study for its more than 1,500 Users worldwide.

"This means that we can now study four different topics in nuclear physics simultaneously," said Ent. "Being able to run experiments in all four halls at the same time allows us much more flexibility in scheduling experiments to maximize the research we can accomplish."

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"Now, by smart scheduling and operation, we can gain at least 25 percent more in physics output, and possibly more!"

Jefferson Lab is a world-leading nuclear physics research laboratory devoted to the study of the building blocks of matter inside the atom's nucleus – quarks and gluons – that make up 99 percent of the mass of our visible universe.

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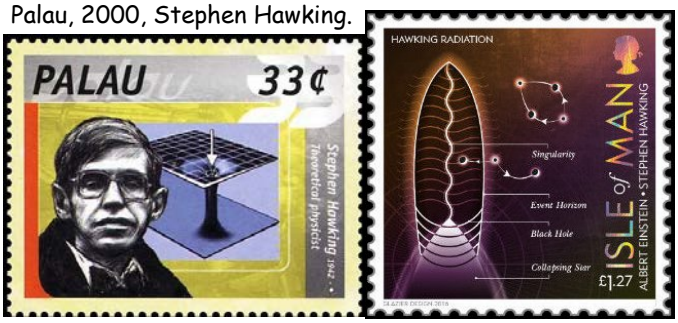
"Science Centers"

Thomas Johnston, tjohnstn@gmail.com

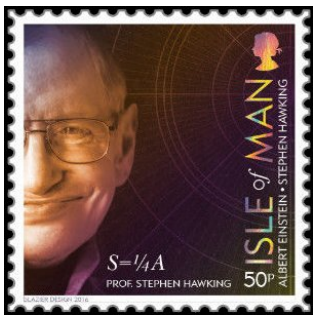
The article will feature some of the significant and some of the more obscure science centers in the world that have been featured on postage stamps. As this is being finalized we learn of the passing of Stephen Hawking on none other than today, 14 March 2018, π Day. To open this piece let me share some stamps that honor Hawking. Nothing more need be said here.

Palau, 2000, Stephen Hawking.

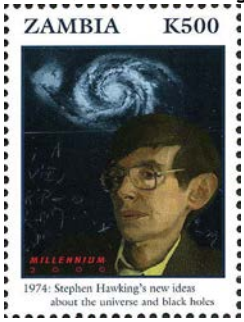


Isle of Man, 2016, Hawking radiation.

Isle of Man, 2016, Hawking.



Zambia, 2000, Hawking.



I had to stretch my philatelic (stamp collecting) albums to their limits to uncover these beauties. For your viewing and reading pleasure, allow me to bring you on a journey as we visit countries across the globe and enjoy a unique selection of stamps.

An early disclaimer, not all countries are represented and not every country that issued a science center stamp will be listed here. Please feel free to respond with comments or to tell me about missing stamps that feature science centers worldwide. The format begins with stamps that represent Conseil Européen pour la Recherche Nucléaire (CERN) with issues from other countries appearing in future newsletter releases.

Austria. Stamp issued on 4 April 2014 to mark the 60th anniversary of CERN.

Austria, 2014, 60th anniversary, CERN.

France. On 22 October 1976, France issued a stamp to honor CERN, the Conseil Européen pour la Recherche Nucléaire, or European Council for Nuclear Research. The organization was formed in 1954. Also pictured here is a First Day Cover.

France, 1976, European Council for Nuclear Research.

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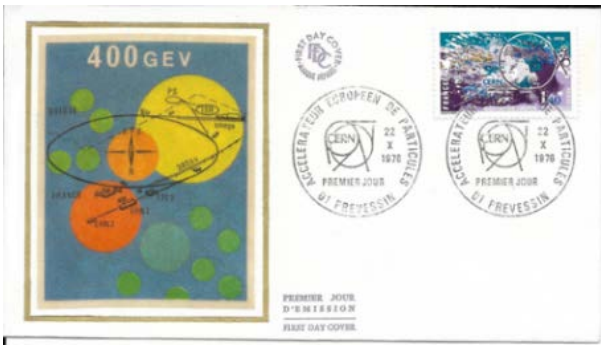

France, 1976, First Day Cover, CERN.
European Council for Nuclear Research.

Spain. This stamp was issued to mark the 50th anniversary of CERN on 19 October 2004.

Spain, 2004, CERN.

Switzerland. On 21 February 1966, Switzerland issued this colorful stamp. Description: European Organization for Nuclear Research, CERN. Images of the stamp include the flags of 13 member nations and nuclear fission. On 9 March 2004, Switzerland released a commemorative stamp to mark CERN's 50th anniversary.

Switzerland, 1966, CERN.

Switzerland, 2004, CERN.

To close for now, this author wishes to thank you for your attention and interest. Anyone out there attend the 1982 World's Fair in Knoxville? Perhaps you have visited or work at one or more of these science centers? Just maybe you know of stamps that I have missed or omitted and feel obliged to bring these stamp issues to my attention. Please send me your comments. Your enjoyment is my pleasure. Please visit and follow my blog for more adventures in science-related stamp collecting. Navigate to ***thomaspjohnston.wordpress.com*** and be sure to hit the link to **Follow**.

"National Building Museum to open Secret Cities: The Architecture and Planning of the Manhattan Project"

Emma Filar, efilar@nbm.org

WASHINGTON, D.C.—On May 3, the National Building Museum presents *Secret Cities: The Architecture and Planning of the Manhattan Project*. This new exhibition explores the vast, highly classified effort to produce the atomic bomb, with an emphasis on the three new "secret cities" that were built to accommodate the tens of thousands of people who worked on the project. Through original documents, photos, artifacts, maps, and models, the exhibition examines Oak Ridge, Tennessee; Hanford/Richland, Washington; and Los Alamos, New Mexico and how their design, planning, and construction proved vital to the success of the Manhattan Project. *Secret Cities* is open through March 3, 2019.

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The development of the atomic bomb—the result of a military initiative known as the Manhattan Project—is one of the most consequential milestones in the history of science. The project laid the foundation not only for the Cold War, which raised the specter of global annihilation, but also nuclear power, as well as radiological medical applications that have saved countless lives.

The Manhattan Project owed its success not only to brilliant scientific work, but also to significant achievements in architecture, engineering, planning, and construction. The effort to produce the world's first nuclear weapon would ultimately involve hundreds of thousands of people and require large-scale, highly secure facilities. In order to accommodate this vast enterprise, the U.S. government built three new cities from scratch: Oak Ridge, Tennessee; Hanford/Richland, Washington; and Los Alamos, New Mexico.

The speed and scale of construction of these cities were in many ways unprecedented. Influenced by the planned community movement and heavily reliant on prefabricated construction, these cities were in many ways proving grounds for emerging ideas about design and planning. Begun in late 1942, they collectively housed a total of more than 125,000 people by the end of the war in August 1945. Yet these cities appeared on no maps, and their existence was a remarkably well-maintained secret until the bombing of Hiroshima.

Secret Cities will inevitably touch on difficult topics such as the use of nuclear weapons in combat, but the focus is on the communities that the government built to support the Manhattan Project. It examines the cities as case studies in modern urban planning and building technology, while revealing the distinct way of life that emerged at each site. The exhibition also explores the architectural and planning legacy of the Manhattan Project, including its role in the emergence of multidisciplinary corporate architecture and engineering firms, as exemplified by Skidmore, Owings & Merrill (SOM), which oversaw the design of Oak Ridge. The exhibition also explores the postwar development of the three cities, which remain important centers of scientific research today.

Control Room at the K-25 plant, Oak Ridge, 1945.
Courtesy National Archives and Records Administration.

A press preview will be held on **Tuesday, May 1, at 10 am**, and feature a tour with curator **G. Martin Moeller, Jr**. RSVP to Emma Filar at efilar@nbm.org. Space is limited.

Images are available at the link below. Caption and crediting information is provided in the same folder. go.nbm.org/secretcitiespress

This exhibition is supported in part by an award from the National Endowment for the Arts. We also gratefully acknowledge STUDIOS Architecture; Alan M. and Nathalie P. Voorhees Fund of The Community Foundation Serving Richmond and Central Virginia, and of the Community Foundation for Northern Virginia, in honor of Fred H. Zimmerli; Bechtel; the Graham Foundation for Advanced Studies in the Fine Arts; HDR, Inc.; Skidmore, Owings, & Merrill; and the Skidmore, Owings, & Merrill Foundation; and ORAU for their generous contributions.

A short word from the editor. Hello, everyone! This is Ted, and I am your newsletter editor for 2018. I hope you enjoyed reading the 1st Quarter 2018 Accelerator Section Newsletter. It was quite a fun experience putting this together and an exercise of the right-hand side of the brain too! Thanks again to all who contributed! Until next time!

-Taiee "Ted" Liang, tliang6@slac.stanford.edu