



The Physics Observer

Feb 6, 2023

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UPCOMING

EVENTS

**Tuesday, February 7,
2023 - 1:30pm, PAT
C-421**

[QIS in Physics:](#)

[Unitarity, causality, and
entanglement in a
geometric theory of
scattering](#)

**Silas Beane, University
of Washington**

**Wednesday, February 8,
2023 - 2:30pm, PAT
C-421 & Zoom**

[InQubator for Quantum
Simulation \(IQUS\):](#)

Welcome

The Physics Observer is a periodic bulletin of happenings in and around UW Physics. Our goal is to share information of notable happenings, events, and news associated with the department. Please feel free to pass this newsletter to anyone who may be interested. Readers wishing to subscribe, or unsubscribe, may do so [here](#). Previous newsletters may be found on the physics website at [The Physics Observer Newsletter](#). Information for future editions may be sent to the editor, physrecp@uw.edu.

Chair's Corner (L. Yaffe)

February is Black History Month. Check out the rotating video display outside the Physics department office to learn about some notable Black physicists.

For many years, room B026 down in the basement of the Physics/Astronomy building (PAB) housed a helium liquifier which provided liquid helium to research labs in both Physics and Chemistry. The liquifier was moved from the old Physics building when the department first moved into PAB in 1993, and operated up until the early 2000's. (Thereafter, liquid helium has been provided by commercial suppliers.) With the shutdown of the liquifier, room B026 devolved into a surplus equipment storage space. After nearly 20 years as a surplus junk room, B026 is finally getting cleared out, with the intent of turning this space into a facility for teaching and research projects involving trapped atoms or ions, as one part of the growing UW investment in quantum science and technology. This transition prompted me to query Emeritus Professor Oscar Vilches about the history of the original helium liquifier. The following is his historical recap:

Paul Higgs designed and built the first helium liquefier, with the help of Arthur(?) Collins (from MIT and later had a factory making Collins liquefiers, sold all over the world by Arthur D. Little Co.). A gas holder, case, and all parts (except for the heat exchangers, some sent by Collins) were made in our machine shop. Paul got a small grant from UW (I have the original proposal in my files in the office) to start a low temperature laboratory. That liquefier had a bank for six cylinders for clean He gas and six cylinders to store the recycled dirty He gas (contaminated with air and oil from transfer and using vacuum pumps to lower T from 4.2K to 1.3K). A compressor for 150 atm to clean the gas was purchased and a helium recovery line was built that ran in the crawl space under the first floor of the old building between the two stairways. The liquefier may have been finished when Greg Dash arrived. Greg had some photos of the parts (I have them in my office, Greg intended to write a history of low temperature at UW). That liquefier made 1 liter/hour, it was run by graduate students under Greg, Paul, and eventually me.

With Greg and my need for helium growing, a 1 liter/hour production couldn't keep up, so we started buying helium. Delivery, at that time, was pretty poor. I can find the exact date, but at some point Dehmelt's group started using superconducting magnets (more liquid helium) and Chemistry started all their magnetic resonance facilities (more liquid helium), delivery continued being sporadic and cost was very high nationwide. The NSF decided to provide grants to build recycling liquid helium facilities. Alvin Kwiram (Chemistry) and I decided to apply for a joint facility, to be installed in the old Physics building. Ernest Henley was Chair of our Department. Alvin and I went to him to explore possible matching funds from UW. Ernest thought it was a good idea, picked up the phone and called the then Provost. We had a meeting with him that afternoon and he called

[TBA](#)

Annabelle Bohrdt,
Harvard University

GENERAL EXAMS

Monday, February 13,
2023 - 12:00pm, PAT
C-520 ([Jiayi Zhu](#))

Tuesday, February 28,
2023 - 2:30pm, PAT
C-520 ([Christian Pederson](#))

Friday, March 3, 2023 -
10:00am, PAT C-108
([Jules Berlin Nde Kengne](#))

SOCIAL MEDIA

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someone, and we got the match (sounds easier than now, right? There was no need to get approval from Executive Committee, Associate Dean, Dean, etc.).

Our proposal was funded. John Stoltenberg and I designed the Physics building recovery system, the liquefier location, and the recovery gas line to Chemistry. UW Facilities did the actual engineering, but John and I walked the underground tunnels between the old building and Chemistry, under the Drumheller fountain, etc....). We bought a Collins liquefier that could produce 12 liter/hour and a 500-liter storage tank. We enlarged the bank of He gas tanks (each large He gas tank holds the equivalent of 11 liters of liquid), adding a very large bank of tanks under the west entrance to the old building. We wanted a very large bank, like CENPA has, but it was too expensive and there was no place to put it (the lack of this very large bank was part of the eventual demise of the facility). We bought a new recovery bag gasholder, and a new compressor for the liquefier. We used Paul Higgs' purifier and compressor, and his old bank of tanks for very pure gas to start the liquefier.

After being built, we bought three 100-liter Dewars so Physics and Chemistry could carry the liquid to their buildings. John Stoltenberg was the first operator/manager of the liquefier, half time, paid by the Department (part of the grant agreement). He was paid the other half from Greg and my grant to help me buy and install a new dilution refrigerator in my lab. This arrangement saved the grants a lot of money, and only during maintenance of the liquefier we had to buy liquid.

With the new building coming in 1995 the liquefier had to be moved. The room you are clearing became its home. I had been the "de facto" manager of the system, but eventually Bob Van Dyck took over. He was the major user in Physics. We had a few temporary operators when John Stoltenberg moved to be the Senior Labs Manager. The operator at the time of the move was Bob James. Van Dyck and I hired him, but he reported to Van Dyck. The recovery line to Chemistry was modified, but eventually abandoned because Chemistry needed too much liquid and they had enough money to buy it. It was also hard also moving tanks from our current building to Chemistry.

At some point during Mark McDermott's tenure as Chair of our Department the helium liquefier became an official Cost Center and all expenses, including the salary of Bob James, had to come out of selling liquid helium. The demand for liquid in Physics had also increased, so Bob James was racking up overtime and buying liquid became cheaper than making it at home and recycling it. Eventually the operation was stopped (against my wish, but it was) and Bob James was let go. During David Boulware's chairmanship the compressors were sold, the recovery helium bag was dismantled, and the room was used as a storage room. I really don't know much about the "end" of the liquefier since Bob Van Dyck and Bob James run the operation at its demise.

Milestones & Arrivals

- ★ Welcome [Ashley Jang](#), our new Fiscal Specialist
- ★ [Professor Emeritus Blayne Heckel](#) celebrates 40 years with UW

Assorted Talks & Meetings

February 28 submission deadline, [\(Re\)sparking Climate Connections](#)

March 5-10, 2023, [APS in-person March Meeting](#), Las Vegas

March 20-22, 2023, [APS virtual March Meeting](#)

March 21-24, [AAAS Pacific Division annual meeting](#), Western Washington Univ., Bellingham

April 14, [World Quantum Day](#), sign-up deadline February 17.

April 15-18, 2023, [APS in-person April Meeting](#), Minneapolis

April 24-26, 2023, [APS virtual April Meeting](#)

Funding Announcements

Letters of intent solicited for [Open Source Software in Research](#), Sloan foundation, 750K. Limited submission, internal UW deadline February 8.

Proposals solicited for [Packard Fellowships for Science and Engineering](#), 875K. Limited submission, internal UW deadline February 22.

Proposals solicited for spring 2023 [Royalty Research Fund](#) awards, college deadline March 6.

Letters of intent solicited for UW Comotion [Innovation Gap Fund](#) awards, deadline March 6.

Job Opportunities

- [Physics Instructor, tenure-track](#), Green River Community College
- [Assistant Professor](#), University of Dayton
- [Experimental nuclear physics postdoc](#), LANL

Selected Publications

Dense nuclear matter equation of state from heavy-ion collisions, A. Sorensen, et al., <https://arxiv.org/abs/2301.13253>

Imaging exciton-polariton transport in MoSe₂ waveguides, M. Scott, X Xu, et al., <https://arxiv.org/abs/2301.12980>

nEDM from the theta-term and chromoEDM operators, V. Cirigliano, et al., <https://arxiv.org/abs/2301.08161>

The mass of charged pions in neutron star matter, B. Fore, S. Reddy, N. Warrington, et al., <https://arxiv.org/abs/2301.07226>

Symmetry TFTs and Anomalies of Non-Invertible Symmetries, J. Kaidi, et al., <https://arxiv.org/abs/2301.07112>

Strain-programmable van der Waals magnetic tunnel junctions, J. Cenker, D. Ovchinnikov, H. Yang, C. Zhu, J. Cai, G. Diederich, Z. Liu, J.-H. Chu, D. Xiao, X. Xu, et al., <https://arxiv.org/abs/2301.03759>

Communication by means of modulated Johnson noise, M. Morales, et al., <https://arxiv.org/abs/2111.08629>

UW Coronavirus Response Information

- Current pandemic information on the [UW Covid-19 tracking dashboard](#).