

2024 **PLAN TO
ATTEND**

SPIE. PHOTONICS WEST

27 January-1 February 2024
The Moscone Center
San Francisco, California, USA

**Join us in San
Francisco at the
year's biggest event**

Meet with the global community during the most exciting week in photonics. This is the best opportunity to connect face-to-face for discussions about biomedical optics, biophotonics, industrial lasers, optoelectronics, microfabrication, MOEMS-MEMS, displays, quantum technologies, photonic integrated circuits, and the whole spectrum of photonics in one place.



REGISTER TODAY

NEW PRODUCTS

Focus on software, data acquisition, and instrumentation

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of its description. Please send all new product submissions to ptpub@aip.org.

Andreas Mandelis

Mathematical programming software

Release 2023b (R2023b) of MathWorks MATLAB and Simulink software introduces two new products and major updates that simplify model-based design and streamline workflows. Simulink Fault Analyzer lets users carry out fault injection simulations without modifying engineering designs. They can time or trigger faults by specific system conditions and perform safety analyses, such as failure mode and effects analysis. When paired with the Requirements Toolbox, Simulink Fault Analyzer helps users create and document formal connections between faults, hazards, fault detection and mitigation logic, and other artifacts. R2023b also includes Polyspace Test, which enables users to develop, manage, and execute C and C++ code tests in embedded systems. With the Polyspace xUnit application programming interface or a graphical test-authoring editor, users can create stubs (simulations of methods or objects) and mocks (for verification of the behavior of code) to make component testing simpler and more efficient. R2023b also features updates to MATLAB and Simulink tools, including the Aerospace, Predictive Maintenance, Signal Integrity, and Wavelet Toolboxes. *The MathWorks Inc, 1 Apple Hill Dr, Natick, MA 01760-2098, www.mathworks.com*



Quantum computing control system

To help quantum computing researchers meet the challenge of scaling up quantum computers, Zurich Instruments has brought to market its QHub

Quantum System Hub. The QHub orchestrates in real time all the high-speed electronic components required to control a quantum computer. According to the company, unlike many other commercial control solutions, its quantum computing control system is designed with a central feedback architecture that provides low and equal latency between all endpoints to optimally support error-correction technologies. The QHub synchronizes up to 448 microwave channels. Through a dedicated interface, it enables precise, reproducible timing synchronization across components and ensures that readout and gate operations on separate channels are aligned and stable in time. Users can program the instrument to optimize for rapid tune-ups and error correction; the processing can be adapted to the specific algorithm and computer architecture used. With its 56 ZSync ports, QHub connects systems suitable for quantum processors with up to 300 superconducting qubits. *Zurich Instruments AG, Technoparkstrasse 1, 8005 Zürich, Switzerland, www.zhinst.com*



High-accuracy mid-IR laser wavelength meter

Bristol Instruments has added the model 671A-MIR to its 671 series of laser wavelength meters. The 671A-MIR supports the characterization of free-space, mid-IR lasers operating in a broad spectral range. The most precise instrument in the 671 product family, it provides an accuracy of ± 0.2 ppm in the $1.5\text{--}5\text{ }\mu\text{m}$ spectral range and an accuracy of ± 1 ppm in the $5\text{--}12\text{ }\mu\text{m}$ spectral range. To achieve reliable accuracy for demanding applications, the 671 laser wavelength meters are continuously calibrated with a built-in helium–neon (HeNe) laser. This is an ideal reference source because its wavelength is well known and fixed by fundamental atomic structure. To achieve the highest accuracy, the model 671A uses a single-frequency HeNe laser that is stabilized using a balanced longitudinal mode technique. For less exacting experiments, the company offers the more economical model 671B with an accuracy of ± 0.75 ppm. It uses a standard HeNe laser as the wavelength reference. **Bristol Instruments Inc**, 770 Canning Pkwy, Victor, NY 14564, www.bristol-inst.com

Micro-diaphragm gas pump

According to KNF, the optimized design of its NMP 820 micro-diaphragm gas pump significantly reduces noise and vibration, which is critical for certain applications. The compact NMP 820 delivers up to 2.1 L/min of free flow. It operates at pressures of up to 1.3 bar relative and generates a vacuum of down to 300 mbar absolute. Adding a second pump head increases free flow up to 3.6 L/min and allows for an ultimate vacuum of down to 100 mbar absolute. Applications for the NMP 820 include point-of-care diagnostics, emissions monitoring, and use in portable medical equipment and fuel-cell and inkjet systems. A standard mounting plate is included for flexible, easy installation, and a four-wired brushless motor option is available for pump control. **KNF Neuberger Inc**, 2 Black Forest Rd, Trenton, NJ 08691-1810, <https://knf.com>



Control platform for large-scale quantum computers

Quantum Machines designed its OPX1000 ultrahigh-speed quantum controller to address the demands of the largest quantum computers. The scalable, modular system features up to 64 output and 16 input channels. According to the company, with up to 10 field-programmable gate arrays, the OPX1000 offers the highest classical processing resources available in any dedicated quantum control solution. The system provides high-speed data sharing between the different front-end modules (FEMs) and between different OPX1000 devices, which allows multiple FEMs to run calculations together. The OPX1000 delivers high analog performance: It offers a bandwidth of 750 MHz and low $1/f$ noise, and it supports 2 gigasamples/s and both direct mode (1 V_{pp}) and amplified mode (5 V_{pp}) with a fast, clean step response. The OPX1000 employs Quantum Machines' proprietary Pulse Processing Unit, which optimizes the integration of quantum operations with ultrafast classical processing and allows for simple programming from 1 to 1000 qubits. **Quantum Machines**, HaMasger St 35, Tel Aviv-Yafo, 6721407, Israel, www.quantum-machines.co

Statement of Ownership, Management, and Circulation

(Act of 12 August 1970; Section 3685, Title 39, USC)

1. Title of publication: PHYSICS TODAY
2. Publication no.: 0031-9228
3. Date of Filing: 12 September 2023
4. Frequency of issue: Monthly
5. No. of issues published annually: 12
6. Annual subscription price: \$25.00
7. Complete mailing address of known office of publication: 1305 Walt Whitman Road, Suite 110, Melville, NY 11747-4300
8. Complete mailing address of the headquarters or general business offices of the publisher: American Institute of Physics, One Physics Ellipse, College Park, MD 20740-3842
9. Full names and complete mailing addresses of publisher, editor, and managing editor:
Publisher: Richard Fitzgerald, American Institute of Physics, One Physics Ellipse, College Park, MD 20740-3842
Editor: Richard Fitzgerald, American Institute of Physics, One Physics Ellipse, College Park, MD 20740-3842
Managing Editor: Richard Fitzgerald, American Institute of Physics, One Physics Ellipse, College Park, MD 20740-3842
10. Owner (if owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as that of each individual owner. If the publication is published by a nonprofit organization, give its name and address.): American Institute of Physics, One Physics Ellipse, College Park, MD 20740-3842
11. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities: None
12. The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes: Has not changed during the preceding 12 months
13. Publication title: PHYSICS TODAY
14. Issue date for circulation data below: August 2023
15. Extent and nature of circulation:

A. Total number of copies (net press run)		
Average*	74 840	August** 75 413
B. Paid subscriptions		
1,2. Mailed subscriptions		
Average*	51 119	August** 51 096
3,4. Sales through dealers and carriers, street vendors, counter sales outside USPS; other classes mailed		
Average*	9 593	August** 9 707
C. Total paid distribution (sum of B1–B4)		
Average*	60 712	August** 60 803
D. Free or nominal rate distribution		
1,2. Free or nominal rate mail copies		
Average*	10 533	August** 10 679
3,4. Free or nominal rate copies mailed at other classes or other distribution		
Average*	3 039	August** 3 369
E. Total free or nominal rate distribution (sum of D1–D4)		
Average*	13 572	August** 14 048
F. Total distribution (sum of C and E)		
Average*	74 284	August** 74 851
G. Copies not distributed (office use, leftovers, and spoiled)		
Average*	556	August** 562
H. Total (sum of F and G—should equal net press run shown in A)		
Average*	74 840	August** 75 413
I. Percent paid (C/F $\times$ 100)		
Average*	81.73%	August** 81.23%
16. Electronic copy circulation: PHYSICS TODAY

A. Paid electronic copies		
Average*	41 645	August** 44 480
B. Total paid print copies (line 15C) plus electronic copies (line 16A)		
Average*	102 357	August** 105 283
C. Total print distribution (line 15F) plus electronic copies (line 16A)		
Average*	115 929	August** 119 331
D. Percent paid (both print and electronic copies) (B/C $\times$ 100)		
Average*	88.29%	August** 88.22%

* Average number of copies of each issue during preceding 12 months.

** Actual number of copies of single issue published nearest to filing date.

I certify that the statements made by me above are correct and complete.

Richard Fitzgerald, Publisher



Pulse-tube cryocooler and helium compressor

Cryomech has unveiled its PT450 pulse-tube cryocooler and CP3000-series helium compressor. According to the company, the combination delivers a heat removal rate, or heat lift, of 5.0 W at 4.2 K, which will facilitate advances in ultralow-temperature applications, including the superconducting qubit modality in quantum technology. The demand for

higher-powered dilution refrigerators to cool superconducting qubits has increased, and with it the need to balance the high heat lift and the ultralow vibration required to achieve fast cooldown. Cryomech says its pulse-tube cryocoolers meet those demands. The PT450 features a base temperature of less than 2.8 K, a cooldown time of 60 min to 4 K, and a long maintenance interval. And it's compact compared with many available 4 K cryocoolers. **Cryomech Inc.**, 6682 Moore Rd, Syracuse, NY 13211, www.cryomech.com



Software for ultra-wideband RF amplifier

Rohde & Schwarz now offers new software for its BBA300 RF amplifiers. The BBA300-PK1 software option lets users accurately set the operating parameters of the amplifier and manage test sequences. It introduces two tools with which users can fine-tune test signals and react flexibly to various requirements. The first is the ability to shift the operating point between Class A and Class AB, which changes the amplifier's response. As a Class A amplifier, the BBA300 provides excellent linearity and harmonic performance. Shifting to Class AB allows pulsed signals to be reproduced accurately and more efficiently at high power. The BBA300-PK1 software also lets users set the amplifier between high power mode for maximum power with a well-matched RF path and VSWR (voltage standing wave ratio) mode for rated power with high tolerance to load mismatches. The VSWR mode is useful in electromagnetic compatibility applications because it maintains rated power up to a VSWR of 6:1. **Rohde & Schwarz GmbH & Co KG**, Mühldorfstrasse 15, 81671 Munich, Germany, www.rohde-schwarz.com



Instrumentation Solutions for Physics

Closed Loop Nanopositioning
Modular Motion Control
AFM & NSOM
Single Molecule Microscopes
Custom Solutions

Worried about lead times? Talk to us!

sales@madcitylabs.com • www.madcitylabs.com



PennState
Eberly College of Science

The **Department of Physics at The Pennsylvania State University** (University Park, Pennsylvania, USA) invites applications for a faculty position (tenure-track), to start in Fall 2024. We are conducting an open-rank search for both experimentalists and theorists. We will most strongly consider experimentalists in the fields of quantum optics and photonics; ultrafast science; and quantum materials and devices, and we will consider theorists across all subfields.

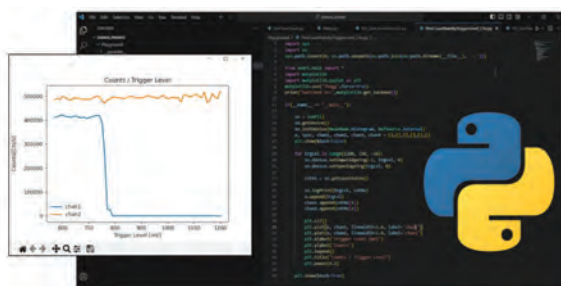
Competitive applicants will have a Ph.D., a record of creative research accomplishments, an innovative future research plan, the ability to achieve teaching excellence at both the undergraduate and graduate levels, and a commitment to fostering a diverse and inclusive community in the practice and teaching of science.

Candidates for Assistant Professor should apply here:
<https://academicjobsonline.org/ajo/jobs/26095>

Candidates for Associate/Full Professor should apply here:
<https://academicjobsonline.org/ajo/jobs/26097>

The Department of Physics has a strong commitment to diversity, equality and inclusion in all areas, and encourages candidates from underrepresented groups to apply.

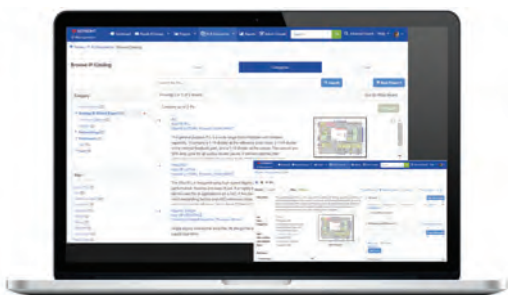
Completed applications received by **December 1, 2023** are assured of full consideration; later applications may be considered until the position is filled.



Python wrapper

PicoQuant has announced its Snappy application programming interface (snAPI). It is a Python wrapper that enables seamless communication and configuration with the company's time-correlated single-photon counting (TCSPC) and time-tagging electronics. By leveraging the power of Python, users can build their own algorithms, implement complex calculations, and develop tailored data-processing pipelines for analysis. Taking advantage of C++ for optimal speed and performance, snAPI bridges the gap between the high-speed capabilities of

PicoQuant's TCSPC devices and the ease of use and flexibility of Python. The low-level control offered by C++ ensures smooth data processing and enables efficient handling of large photon counts and their real-time analysis. The wrapper provides the option to access unfolded data from the TCSPC devices or conveniently read from PTU (Performer Terrain Utilities) files. That allows researchers, developers, and scientists to explore their data more deeply and extract valuable insights. PicoQuant's snAPI is available free at GitHub. **PicoQuant**, Rudower Chaussee 29, 12489 Berlin, Germany, www.picoquant.com



Design and simulation software

The latest release of Keysight's suite of electronic design automation (EDA) software tools, PathWave Design 2024, includes new features to enhance design productivity. A Python application programming inter-

face enables Keysight's EDA software tools and third-party partner tools to interoperate in automation workflows in RF/microwave and high-speed digital design. It supports more efficient design verification, reduces repetitive work, and helps cut down on human errors. With the former Clisofit products now integrated into PathWave Design 2024, Keysight Design Data Management (formerly Clisofit SOS) offers designers optimal file archiving, advanced revision control, disk storage optimization, and more. Keysight IP Management (formerly Clisofit HUB) enables efficient IP management, IP reuse, and IP traceability. **Keysight Technologies Inc**, 1400 Fountaingrove Pkwy, Santa Rosa, CA 95403-1738, www.keysight.com



Compact dual-comb spectrometer

The IRis-C is the next-generation instrument in IRsweep's quantum cascade laser (QCL) frequency-comb spectrometer line. It uses the same dual-comb spectroscopy technology as IRsweep's IRis-F1, which offers microsecond time resolution, high spectral resolution, and high optical brightness in the mid-IR, but has been reduced in size and cost. Within a compact design, the prealigned reference-beam path ensures high signal quality, and the free-space sample beam ensures easy coupling to any application-specific interface. The high optical power of QCLs facilitates their use with strongly absorbing samples, such as aqueous solutions, and the internal coalignment of the two frequency combs ascertains good copropagation over distances of up to 2 m. The IRis-C is suitable for chemical and biochemical reaction kinetics, protein folding and similarity tests, catalysis studies, combustion diagnostics, and other challenging vibrational spectroscopy tasks. **Sensirion AG c/o IRsweep**, Laubisrütistrasse 44, 8712 Stäfa, Switzerland, <https://irsweep.com>

PT

Virtual chart recorder and Web server

Omega's new-and-improved iServer 2 virtual chart recorder and Web server provides an intuitive way to collect and display live temperature, humidity, and barometric pressure readings using either a Web-based user interface (UI) or the Omega Link ecosystem. With expanded internal nonvolatile storage, up to 10 years of data can be stored and viewed locally at any time with no need for external SD cards. When the power adapter is plugged in, the preconfigured Omega Link smart probe and the unit begin to log data and display live readings. To manage stored data, view live data, and configure alerts through the Web-based UI, users can connect to the iServer 2 via a wireless network or USB. Configurable features include selective data extraction, measurement and device traceability, local alarms, and adaptive transmission rates. Standard and deluxe models provide configurable input/output ports that can be used for applications such as driving relays, triggering physical alarms, and sensing contacts like door switches. **Omega Engineering Inc**, 800 Connecticut Ave, Ste 5N01, Norwalk, CT 06854, www.omega.com

