Press Release



Stephen Val Milton (courtesy of Tau Systems)

High-resolution photos: download here (link available until Dec. 17, 2026)

Contact: American Physical Society Honors - honors@aps.org

Title depends on who is publishing:

1. **Local Physicist Stephen Milton to Receive Prestigious Wilson Prize**
2. **Particle Accelerator and Laser Physicist Stephen Val Milton to Receive the Wilson Prize**
3. **Tau Systems' Particle Accelerator and Laser Physicist Stephen Val Milton to Receive the Wilson Prize**

Local media may drop the section "A Love of Beams of Both Particles and Light."

(CHICAGO, Nov. 18, 2026) – Stephen V. Milton, a particle accelerator and laser physicist at Tau Systems Inc. (www.tausystems.com), has been named the 2027 recipient of the Robert R. Wilson Prize for Achievement in the Physics of Particle Accelerators (https://www.aps.org/funding-recognition/prize/wilson). Presented by the American Physical Society (APS), the prize will be awarded to Milton at the 2027 APS Global Summit (https://summit.aps.org), to be held in Atlanta, Georgia, in April 2027. He will also be honored at the APS-cosponsored 2027 International Particle Accelerator Conference (IPAC) (https://ipac27.org) in Detroit, Michigan, in May 2027.

Nominations for the Wilson Prize are open to scientists of all nations, and this award is the premier recognition of achievement in the physics of particle accelerators. The prize was established in 1986 by friends of Robert R. Wilson, the APS Division of Particles and Fields, and the Division of Physics of Beams. Robert Rathbun Wilson (https://en.wikipedia.org/wiki/Robert_R._Wilson) was an experimental physicist who designed some of the world's most powerful particle accelerators used to study the fundamental nature of matter. He was the architect and inaugural director of Fermi National Accelerator Laboratory (Fermilab) in Batavia, Illinois (https://www.fnal.gov).

Particle accelerators, colloquially called "atom smashers," are machines that can produce and accelerate charged particle beams to extremely high energies. Since their inception, they have advanced research fields ranging from nuclear physics to human biology to the study of fundamental particles such as quarks and gluons. These machines can also be applied beyond discovery physics research to solve practical, global challenges. Both humans and animals benefit, as particle accelerators can, for instance,

treat cancer with radiation therapy, a concept first proposed by Wilson, as well as create reliable sources of critical medical isotopes. The environment also benefits through new all-electric, chemical-free methods of waste stream treatment and novel methods of manufacturing and hardening materials, such as improving the lifetime of pavement. In global security, particle accelerators are used in many areas, including testing the space readiness of semiconductors for the space radiation environment, monitoring nuclear treaties, and inspecting cargo.

Stephen Milton is a pioneer in the particle accelerator sub-field of free-electron lasers. His citation for the Wilson Prize is: "For fundamental contributions to the development of X-ray free-electron lasers, including the first demonstration of saturated self-amplified spontaneous emission, and for leadership in the design and construction of the FERMI facility at the Elettra Sincrotrone Trieste in Italy, the world's first seeded free-electron laser facility."

FERMI: https://www.elettra.eu/enu/lightsources/fermi/fermi.html

Elettra Sincrotrone Trieste: https://www.elettra.eu

Pause: select one of the two FEL descriptions.

Version I – for scientific institutions

A free-electron laser (FEL) is a unique type of laser generated by extracting energy from a pure and orderly beam of energetic electrons. Most people think of a laser as being generated from electrons trapped inside atoms or molecules, such as in gases or crystals, but an FEL uses "free electrons" brought to high speed, hence the name of these devices. In FELs, the frequency of the light emitted is related to the electron beam's energy and the characteristics of a magnetic array. The array is used to transversely accelerate the electrons, and the result is electromagnetic energy at a very well-defined wavelength. What is unique to the FEL is that the relativistic electrons in the beam initially radiate independently, but then the FEL process forces the electrons into bunches the length of the wavelength, and they then radiate coherently like a traditional laser. The other unique thing about FELs is that they can be designed for a variety of energies, from the terahertz (sub-infrared) to the ultraviolet to hard X-rays, making them useful beyond what ordinary lasers can do.

Version II – for public release

A free-electron laser (FEL) is a unique and intense form of laser generated by extracting energy from a pure and orderly beam of energetic electrons.

Continue.

FEL devices have many uses, from discovery science (used today) to a new light source for electronic chip production in the semiconductor industry (being developed), to defense applications, to beaming power to areas without electrical infrastructure, such as space or areas recovering from a natural disaster.

Coming back to the prize's namesake, Robert R. Wilson (1914–2000) made many contributions to the field of physics, including particle accelerator physics. During World War II, he served on the Manhattan Project, leading the research division at the Los Alamos Laboratory. He served as the founding director of the Department of Energy's Fermi National Accelerator Laboratory from 1967 to 1978, designing major particle accelerators and the iconic 16-story Wilson Hall. In 1946, he proposed using the "Bragg peak" of proton and ion beams for deep-seated cancer treatment. The Bragg peak is essentially where the beam stops and releases its energy, meaning that the beam deposits

most of its energy into a tumor and much less elsewhere. It was Wilson's influence that helped push for the proton and other ion beam therapy machines we know today. He also taught at Cornell and Harvard universities, chaired the Federation of American Scientists, and worked as an artist and sculptor.

A Love of Beams of Both Particles and Light

This year's Wilson Prize winner, Milton, received his associate's degree at Sacramento City College and his bachelor's degree at the University of California, Davis, where he also had an internship at the Crocker Nuclear Laboratory, which operates a cyclotron particle accelerator generating proton beams for a variety of applications. From UC Davis, he headed to Murray Hill, New Jersey, where he worked at Bell Laboratories as a Senior Technical Associate in the Physical Chemistry Division. There he got a taste for another type of beam – a laser – as he designed, built, operated, and maintained picosecond and sub-picosecond laser systems and participated in the use of these systems in a wide variety of experiments in the area of time-domain spectroscopy of organic and biological compounds.

Milton left Bell Laboratories to pursue his master's (awarded 1988) and Ph.D. (awarded 1990) degrees in physics at Cornell University, specializing in accelerator physics. His thesis advisor was Raffael Littauer, a contemporary of Robert Wilson and also a Wilson Prize winner.

Milton did his postdoctoral work on a variety of particle accelerator projects at the Paul Scherrer Institute (Villigen, Switzerland) before heading back stateside to Argonne National Laboratory, where he held a variety of positions.

At Argonne, Milton helped build and commission the Advanced Photon Source. Operational since 1996, it is an X-ray synchrotron light source facility with over 5,000 unique users a year. While there, he led a team that made the first proof of principle of a self-amplified spontaneous emission (SASE) free-electron laser (FEL) in the visible to ultraviolet wavelengths. While at the Advanced Photon Source, Milton worked for Lee C. Teng, another Wilson Prize winner. Teng designed the Loma Linda proton source used for cancer treatment that Wilson himself had first envisioned in 1946. On a personal note, in 2012 his wife's cousin, Scott Rex, was treated for ocular melanoma with the Loma Linda machine, after doctors recommended this treatment instead of surgery to remove the eye or the implantation of radioactive seeds. Scott has been cancer-free since 2012.

Milton's activities at Argonne paved the way for him to help with the Linac Coherent Light Source (LCLS) at SLAC in Menlo Park, California. The LCLS was the first FEL to operate at X-ray wavelengths and, since 2009, has served as an operational user facility for scientists around the world.

After his LCLS contributions, he was asked to lead the build-up of another user facility – the FERMI@Elettra Project at Sincrotrone Trieste in Basovizza, Italy. This is an even brighter, more coherent type of FEL, operating from the ultraviolet to soft X-rays with pulse durations as short as 10 femtoseconds. This December, the facility marks 16 years of operation.

After FERMI@Elettra, he held a number of roles. He has worked as a professor at various institutions, mentoring and graduating students, including Lund University in Sweden and Colorado State University (CSU) in Colorado. Since 2002, he has been a principal of Element Aero, an R&D and consulting firm whose activities include developing an FEL for the U.S. Navy for shipboard defense against missiles.

Following CSU, Milton took on the role of Division Leader of the Accelerator Operations and Technology Division at Los Alamos National Laboratory (New Mexico). The division operates, maintains, and upgrades the Los Alamos Neutron Science Center (LANSCE) accelerator complex, a nearly 1 MW H^+/H^- linear accelerator that provides simultaneous beams to five different and unique experimental programs, ranging from discovery science, to medical isotopes, to programs directly relevant to the laboratory's core mission of stockpile stewardship.

Presently, he serves as Vice President of Accelerator Science at TAU Systems Inc., where he is a member of the core top-level management team. He oversees the overall development of accelerator systems for a variety of industrial and scientific applications. Recently, Tau teamed with Lawrence Berkeley National Laboratory to achieve FEL operation using a compact laser-driven particle accelerator instead of one driven by traditional radio-frequency cavities.

Past Accolades and Contributions

Milton is a Fellow of the American Physical Society and a Fellow of the Institute of Electrical and Electronics Engineers, and he received the IEEE Nuclear and Plasma Sciences Society's Particle Accelerator Science and Technology Award. He also received Distinguished Performance Awards from both Los Alamos National Laboratory and Argonne National Laboratory.

As an undergraduate, he received the Association of Western Universities Fellowship at the Crocker Nuclear Laboratory in 1980, an opportunity that likely sparked his entire career in particle beams and lasers.

Milton has authored 72 archival papers, as well as numerous conference papers, books, and book chapters, including an open-access book on quantum mechanics (Elementi di Meccanica Quantistica, ENEA ISSN/0393-3016, 2015).

Other Activities

Milton is an avid enthusiast of all moving devices, not just photons and particles. He flies planes, sails, rides a motorcycle, and loves all classic (and fast) cars.

Together with his wife and collaborator, Sandra Biedron, and their son, Sebastian Milton, he is restoring the family's two historic properties in the Beverly Hills and Morgan Park areas of Chicago. Both homes have been featured on local architectural tours sponsored by the Beverly Area Planning Association, and the one in Morgan Park (the Ingersoll-Blackwelder House) often appears on additional architectural tours such as Open House Chicago, sponsored by the Chicago Architecture Center. The Ingersoll-Blackwelder House has also appeared in several TV pilots and films.

Finally, the family also curates several historical items that once belonged to Enrico Fermi, including the steamer trunk and several items the Fermi family brought from Europe in 1938, when they emigrated after Fermi received the Nobel Prize. These items, along with other historical documents and graphite from the moderators of the world's first and second nuclear reactors, are often on display at scientific and historical celebrations of global science, including at the Italian Embassy to the United States.

He is humbled and grateful to have been selected for this award and is looking forward to celebrating it in 2027 at a variety of private and public events with colleagues, friends, and family in the U.S. and Italy.