

AIP | Matters

A weekly publication of the American Institute of Physics

February 9, 2015

Director's Matters

By H. Frederick Dylla, Executive Director & CEO



Lighting the way for innovation

The world lost a remarkable scientist on January 27 when [Charles Townes](#), who is most connected to the invention of the laser, passed away just six months shy of his 100th birthday.

Townes' scientific journey that led to the concept of the laser began with his work at Columbia University on molecular spectroscopy using microwaves. The first intense microwave sources were invented during World War II and applied to early radar systems. In the postwar period, microwave technology was continually advancing for communication systems that took advantage of the higher information-carrying ability of these higher-frequency radio waves. That evolution continues today as our burgeoning cell-phone system takes advantage of gigahertz-range transmission over the short distances between handsets and cell towers.

In his oral histories archived in AIP's Niels Bohr Library and Archives, Townes recounts his "aha" moment that occurred as he was sitting on a Washington, DC, park bench in 1951, pondering the problem of how to make more intense microwave radiation than could be obtained with the usual source of any form of electromagnetic radiation—a body heated to a certain temperature which emits radiation according to a well-defined spectral curve called the black body curve. By using radiation that is emitted by atoms or molecules as they are first excited to higher



Charles Townes, Arthur Schawlow converse outdoors.
Courtesy of the AIP Emilio Segrè Visual Archives.

energy states and then forced to emit in unison, the limits of this black body curve could be greatly exceeded, and the emitted radiation could be tuned to specific wavelengths. This idea was brought to practice in the first MASER—Townes' abbreviation for microwave amplification by stimulated emission of radiation. Townes and his brother-in-law, fellow Nobel laureate Arthur Schawlow, then coauthored a seminal 1958 *Physical Review* paper, "[Infrared and Optical Masers](#)." The paper predicted that the maser effect could be extended to infrared and visible light wavelengths. Thus, the concept of the laser was born.

[Read more.](#)

Physics Resource Matters

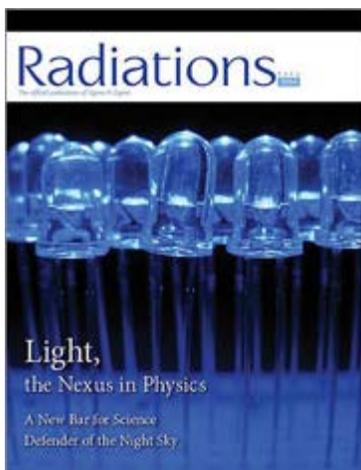
Spencer Weart awarded 2015 Abraham Pais Prize



Spencer Weart, director of AIP's Center for History of Physics from 1974 until his retirement in 2009, has received the 2015 Abraham Pais Prize for History of Physics. The prize is awarded annually and was established in 2005 by the APS through its Forum on the History of Physics and by AIP to recognize outstanding scholarly achievements in the history of physics.

[Read more.](#)

Off the Press



Radiations, [Fall 2014 issue](#)

A Publication of Sigma Pi Sigma

Cover: Blue light-emitting diodes, a photo by Gussisaurio, is presented here in honor of the 2014 Nobel Prize in Physics, awarded jointly to Isamu Akasaki, Hiroshi Amano, and Shuji Nakamura. In this issue, we explore “Light, the Nexus in Physics” with Dwight E. Neuenschwander. The [full issue](#) is available through the Sigma Pi Sigma website.

Coming Up

February 11

- AIP and AIP Publishing birthday celebrations (College Park and Melville)

February 12-16

- AAAS Annual Meeting (San Jose, CA)

February 16

- AIP Investment Advisory Committee (IAC) meeting (Phoenix, AZ)
- AIP and AIP Publishing offices closed for President's Day (College Park and Melville)

February 25

- AIP Publishing Board of Managers meeting (NY, NY)

February 25-28

- NSBP 2015 Annual Conference (Baltimore, MD)

- AIP Education Advisory Committee Meeting (Baltimore, MD)

February 26-27

- Physics Resources Advisory Committee meetings (College Park, MD)

February 28

- Physics Resources Policy Committee meeting (College Park, MD)

March 2-6

- APS March Meeting (San Antonio, TX)

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