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PHYSICS TODAY

John Madey

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In Memoriam: FEL Pioneer John Madey

The international accelerator community has been deeply saddened to learn about the passing of the pioneer of the free-electron laser, Professor John M. Madey from the University of Hawaii at Mānoa. Madey has left us on July 5, 2016 [University of Hawai'i News, 20 July 2016; message from Prof. Pui Lam].

Raised in Clark, New Jersey, John Madey and his older brother Jules took an early interest in ham radio. In 1956, when John was 13 and Jules was 16, they began relaying communications from the South Pole to families and friends in the United States. Madey received a BS degree in Physics and a MS degree in Quantum Electronics from the California Institute of Technology in 1964 and 1965, where he first raised the question whether or not it was possible to enhance the transition rate for bremsstrahlung through stimulated emission. He continued thinking about the stimulated emission question while working on his doctoral degree at Stanford, at which time he invented the free-electron laser.

A free-electron laser device can produce coherent electromagnetic radiation of extremely high intensity and high quality that is tunable over a wide range of frequency. This renders the free-electron laser (FEL) of great interest for research in physics, chemistry, biology and medicine. While classical FELs use mirrors or optical cavities, a more recent FEL variant, operating at ever shorter wavelengths, is the linac-based free-electron laser, such as the Linac Coherent Light Source at SLAC or the European X-ray FEL in Hamburg, Germany.

Madey was awarded a PhD in 1970, and appointed as Professor (Research) of Electrical Engineering in 1986. In 1988 he left Stanford, taking a tenured position at the Physics Department of Duke University and moving his FEL research laboratory with him the following year. John Madey joined the Department of Physics and Astronomy at the University of Hawai'i at Mānoa in 1998.

Madey was bestowed with numerous awards and international recognitions, including the Stuart Ballantine Medal from the Franklin Institute in 1989, the 2012 Robert R. Wilson Prize from the American Physical Society and the 2016 Willis E. Lamb Award for Laser Science and Quantum Optics. Madey was the keynote speaker at the 2015 Nobel Symposium on Free-Electron Lasers in Sigtuna, Sweden. He held 13 patents on free-electron laser related technological inventions.

Prof. Madey published many important papers in Physical Reviews journals including a seminal PRL publication ("Observation of Stimulated Emission of Radiation by Relativistic Electrons in a Spatially Periodic Transverse Magnetic Field" http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.36.717) in 1976, and, more recently, a comprehensive PRST-AB review article on the history of the FEL invention ("Wilson Prize article: From vacuum tubes to lasers and back again" https://journals.aps.org/prab/abstract/10.1103/PhysRevSTAB.17.074901).

John Madey [University of Hawai'i News, 20 July 2016, http://www.hawaii.edu/news/2016/07/20/in-memoriam-physicist-and-inventor-john-madey]

More information

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