

Laser celebrations

A major celebration of the 50th anniversary of the laser is planned for 16 May — the date of the first demonstration of lasing by Theodore Maiman at the Hughes Research Laboratories. A special afternoon symposium, part of the year-long anniversary programme called LaserFest, will take place at the Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS) in San Jose, USA, and will involve talks from many of the original pioneers as well as several Nobel Prize winners.

The symposium entitled ‘Retrospectives on the invention of the laser’ will take place from 3 pm to 6 pm at the San Jose McEnery Convention Center. It will feature contributions from Zhores Alferov (Ioffe Physico Technical Institute), Nico Bloembergen (University of Arizona), Jeff Hecht (freelance writer), Ali Javan (MIT), Kathleen Maiman, Kumar Patel (University of California at Los Angeles), Tony Siegman (Stanford University), Peter Sorokin (IBM), Charles Townes (University of California at Berkeley) and Orazio Svelto (Politecnico di Milano).

“To mark the anniversary date of this historic occasion, 16 May, we’ve gathered laser pioneers, historians and others to talk about their experiences and contributions to one of the greatest inventions of the twentieth century,” explained the organizers of the CLEO conference.

LaserFest was set up by the American Physical Society (APS), the Optical Society of America (OSA), SPIE and the IEEE Photonics Society, with the aim of emphasizing the laser’s impact throughout



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Tom Baer says the aim of Laserfest is not just to honour pioneers of laser science but also to inspire students and young scientists to study photonics.

history and highlighting its potential for the future.

Thomas Baer, from Stanford Photonics Research Center and a member of LaserFest’s technical advisory committee, told *Technology Focus*, “LaserFest has several aims. We want to honour the original innovators of the laser; educate the general population about the important role lasers are playing in our everyday lives; inspire students and young scientists into the dynamic field of photonics; and promote investment in basic research.”

This is being achieved through laser-oriented seminars and conferences across the globe, as well as by outreach programmes such as ‘LaserFest on the Road’, in which experienced outreach teams from universities and science museums conduct laser-based demonstrations in

the community. LaserFest even has its very own superhero, Spectra. “LaserFest Physics Quest is an educational activity for middle-school students to solve a mystery involving a famous physicist,” explains Baer. “Experiments involving lasers and light provide clues to the mystery. The quest features superhero Spectra and her epic battle with the evil Miss Alignment. Spectra also will be making appearances throughout LaserFest as a symbol of laser power.”

LaserFest has had considerable involvement from the founders’ student chapters. For example, ‘Hit the Target’, a laser kit learning activity, has been distributed to OSA/SPIE student chapters for educational demonstrations to middle-school students, and a Laser Graffiti video competition has been organised in which student chapters are creating educational videos about the science and technology of lasers. These are to be posted on YouTube and entered into a competition, with awards given at CLEO/QELS.

Events are scheduled throughout the year, but for the OSA specifically, the closing event will be at its annual meeting, *Frontiers in Optics*, 24–28 October, in Rochester, New York. “There we will recognize all of the organizations participating in LaserFest from countries around the world,” says Baer. “Among other events, we are planning a special programme for our student chapter leaders in which they will meet with many of the original laser pioneers to discuss the historic developments that occurred 50 years ago.”

For more information about LaserFest and its planned activities throughout 2010, please visit www.laserfest.org.

European group develops long-wavelength VCSELs

A pan-European research project has developed long-wavelength vertical-cavity surface-emitting lasers (VCSELs) for next-generation high-speed communications systems. Called MOSEL, the three-year project was led by CEA-Leti (France) and included three academic partners, DTU Fotonik of Denmark, EPFL of Switzerland and KTH of Sweden, and two industrial partners, Alight Technologies of Denmark and BeamExpress of Switzerland.

The researchers demonstrated error-free 10 Gbit s⁻¹ operation up to 100 °C,

concurrently with record performance: single-mode (>30 dB side mode suppression ratio) power of >1 mW up to 100 °C (>2 mW at room temperature) and 10 Gbit s⁻¹ modulation and transmission over 10 km of single-mode fibre with a bit error rate of <10⁻¹¹ up to 100 °C with <1 dB power penalty.

Each of the partners played specific roles in the development of the technology. For example, EPFL and BeamExpress worked closely together to improve the performance of VCSELs in the 1,310 nm waveband and to reach the commercialization stage based on their proprietary InP–GaAs wafer-fusion technology. The devices are fabricated using

2-inch wafer technology, and incorporate patterned tunnel junctions and other intracavity structuring elements for efficient carrier and photon confinement.

KTH has used a novel regrowth technology with mode-selective elements for high-power single-mode emission; Alight has refined its photonic crystal structuring of its long-wavelength GaInNAs/GaAs VCSELs; CEA-Leti has developed new VCSEL designs using a recently suggested high-reflectivity-mirror concept based on subwavelength grating mirrors; and DTU Fotonik has carried out extensive numerical investigation of VCSELs with nano- and microstructures.