Editorial

Jack D. Gaskill, Editor

Optoelectronics education (or is it photonics education?)

In July of this year I had the pleasure of attending the Workshop on Optoelectronics Education held near Estes Park, Colorado. This workshop, which was organized by Tom Cathey of the University of Colorado, was funded jointly by the U.S. National Science Foundation, the U.S. Air Force Office of Scientific Research, Newport Corporation, the State of Colorado, and the Optoelectronic Systems Center of the University of Colorado. I'm not certain whether it was the beautiful setting at the foot of 4345-m Long's Peak or simply an unbridled enthusiasm for educational matters, but the 36 attendees from academia and industry worked diligently for three days (and two nights) exploring program goals, curricula, teaching methods, etc., as related to optoelectronics education at the undergraduate level. The final product of this workshop was a 38-page report, which I am told will be published this month by the Optical Society of America.

I believe this report will be very helpful to departments and institutions wishing either to update their optoelectronics programs in a general way or to refine them in a particular fashion. One of the report's most enlightened suggestions for program refinement, in my opinion, is a proposal to change the manner in which electromagnetic theory is taught in upper-division physics courses (upper-division courses are taken during the third and fourth years at universities in the United States, which may correspond to different years in other countries). A principal spokesman for this change is Cy Cantrell of the University of Texas at Dallas, who basically argues that these students spend too much time studying electrostatics and magnetostatics and not enough time studying electrodynamics.

Cy and his supporters propose the creation of a new upper-division physics core course in electromagnetic theory that begins with Maxwell's equations in integral form and makes use of laser-based demonstrations, as well as computer simulations, of interference and diffraction phenomena to motivate students while educating them. They suggest that this course should make heavy use of "notebooks" in advanced computer languages "to help students visualize fields, solve problems that go beyond the usual tiny set of analytically solvable geometries, and observe animations of electrodynamic phenomena such as radiation." Also included might be the emission and absorption of light by moving charges, nonlinear interactions of electromagnetic fields, the propagation of electromagnetic fields in conducting and dielectric waveguides, propagation in inhomogeneous or anisotropic media, scattering by conducting or dielectric surfaces, and the propagation of pulses in dispersive media.

Although no such sentiment was apparent at the workshop, there are those who oppose any reduction of emphasis on electrostatics and magnetostatics in the study of electromagnetism. Such individuals argue, with some validity, that the mathematical tools developed (or honed) in the study of electro- and magnetostatics are too valuable to be bypassed, and that everybody needs to have a solid understanding of the static nature of electromagnetism before tackling electrodynamics. In spite of the apparent logic of these arguments, I detect in them just a bit of the "if it was good enough for me, it's good enough for them" syndrome, and I also sense some of the "character building" philosophy we are all familiar with. And, after carefully considering the pros and the cons, I can only conclude that this proposal has significant merit. Even if the idea were to be generally accepted, however, it would require changes that could not be accomplished overnight: new textbooks would be needed, instructional techniques using computers would have to be developed or improved, etc. Nevertheless, it is definitely an idea worth pursuing.

As long as we are pursuing, why not consider once again the adoption of the name photonics to replace optics, optical physics, electro-optics, optoelectronics, optical sciences, and all the other names in use that cannot be defined with precision and/or have significantly overlapping definitions? The more I think about it, the more I like it!

Special Section Call for Papers

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Infrared Imaging Systems

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The November 1991 issue of *Optical Engineering* will be devoted to the subject of infrared imaging systems. Topics to be covered include the full range of systems applications, advanced systems design, device technology, systems analysis, device and systems modeling, human factor issues, and testing of devices and systems, pertaining to infrared detectors, focal plane arrays, intensifier tubes, FLIR, staring arrays, scanning detectors, and more.

Within this range of topics, the intent is to provide a broad overview of the current state of the art and the trends for future technology development. Application areas include reseach, defense, and industry. Authors are encouraged to submit manuscripts for consideration on any one of the above or related topics to the Guest Editor before April 1, 1991.

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