Could Photonics Kill Optics?

Behind the question in the title, the real point is a question that has been asked many times. Does photonics contain optics or does optics contain photonics?

Several years ago, a committee of the U.S. National Science Foundation (NSF) did a review of the field of optics. This committee, having analyzed all aspects of optics, made a recommendation that in the future scientists use the term “optical science and engineering.” This classification was thought to convey a more general meaning than does the word “photonics.” Their report, “Harnessing Light,” was seen and is still seen as a very important contribution to promote optical science and optical technology as fields to be considered by granting bodies worldwide.

I remember the time when I decided to study optics at the graduate level. At the time, nuclear physicists were dominant in the Department of Physics. Choosing to do optics was still seen as a kind of madness, although holography was flourishing and lasers were rapidly developing (new kinds of lasers were put on the market regularly). Most of those scientists thought that optical instrumentation would become essential and vital.

It so happens that a revolution was ignited using optics and optical technologies. So, some scientists saw this new development as very promising for the future. People with a broader view immediately foresaw the possibilities offered by optics. A dream popped up that optics and optical technology would supplant electronics technologies. The term photonics was created to be to optics what the term electronics is to electrical sciences: the engineering side of optics.

Researchers worked very hard to develop applications to lasers other than holography. In the meantime, optical

fibers became a reality. Due to the speed of light and its wide spectrum, one application took the lead of optical applications: communications became photonics. Adding the word “photonics” to any optics category became a hot topic. The market growth due to this one aspect of optics has been so large that it has dwarfed the rest of optics. Fortunately the other aspects are starting to grow now.

As we know, the pendulum effect shows that when the ball is displaced far from its equilibrium point, it tends to come back and go far from its equilibrium point on the opposite side.

What will happen to optical science in general if “photonics” continues to remove “optics” from our language? What will happen if the granting bodies closely associate their money to communications only? Basic research in optics is already losing support. We know that without basic research, new technical breakthroughs would be difficult to achieve! We have already seen a transfer of grants from basic to applied research. Must we, as optical scientists, help to emphasize this?

The question of applied versus basic research has been discussed for years, and still may be for years to come. It is important that all of us try to convince our governments and granting bodies that optics will play a more important role among research fields if we all designate our field as “optical science and engineering” as was proposed by the NSF committee.

Hopefully, our field will not shrink to include only communications, but will remain a general field that continues to cover all aspects of life where optics can and must play a role.

The reader will easily understand that, to me, optics contains photonics.

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