editorial

Coupling physics and medicine

On the 25th anniversary of the American Association of Physicists in Medicine (see page 25) it is fitting to observe that many opportunities exist at the frontiers of medicine for physicists of all subdisciplines. There is no lack of interesting and enjoyable problems to attack. Who can apply the tools of physics better than physicists? In the past, both the public and physicians have been slow to recognize their dependence on physicists for fresh research ideas and new instruments. But during the last 25 years the prestige of physicists working in medicine has seen a considerable improvement. With a society increasingly influenced by science and technology, physics is now widely regarded as having much to contribute for the betterment of mankind. Large university-based medical centers, in increasing numbers, now conduct research with multidisciplinary teams and physicists have assumed leadership roles. But this research requires adequate funds and well trained young scientists. We must repeat the warning recently expressed over and over again that unless a large national effort is taken to improve the quality of science and technology education in the US the consequences will be catastrophic—for the medical physics field as well as many others.

We need a lot of good ideas from our young people. We need to arrive at ways of doing things better, faster and cheaper. This progress cannot be achieved without adequate support for teaching, training and research in both basic and applied physics. Look at the role of nuclear magnetic resonance. When Wolfgang Pauli introduced the concept of nuclear angular momentem, who would have expected that it would one day revolutionize the practice of medicine. New medical imaging systems based on the principles of nuclear magnetic resonance have now emerged and they offer great potential for physicians to "look" non-invasively inside the human body and seek information that will be useful in forming better diagnoses and in providing appropriate treatment. This application may be only the beginning of more benefits yet to come from Pauli's contribution.

Similarly one can point to other basic discoveries in physics in the past, which at first glance would seem to have little practical applications, but which have had an important beneficial impact on the quality of human life. These discoveries have laid the foundation for a successful coalition between physics and medicine. They have demonstrated the ability of physics to help resolve the marvels of the intricate working of the human machine. Soon after their discovery, radioactivity and x rays became indispensable in the delivery of health care. The discovery of elementary particles and the building of powerful accelerators for nuclear physics experiments saw their immediate application in the conquest of cancer. The development of fiber optics has produced great advances in medical visualization using flexible instruments. Laser scalpels have emerged as powerful tools in many surgical innovations. More recently, the widespread use of computers and digital techniques has seen the beginnings of digital revolution in the manipulation and processing of three-dimensional images of the complex internal structures within the human body. These exciting developments are but a few examples where physicists, with the help of physics, have made our own clinical lives more satisfactory.

It is my strong belief that today any good physicists with powerful new ideas can quickly find themselves at the forefront of medicine—if they know how to communicate with the medical community. Hence, if we believe that it is important that we, our children and future generations should have access to the most sophisticated medical treatment possible, then we must place a high value on improving communications still further between physicists and physicians. This is one of the primary goals of the American Association of Physicists in Medicine and on our anniversary we invite all physicists to help us in this endeavor.

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