MAR08-2007-000645

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

Overview of Medical Imaging

WILLIAM HENDEE, Medical College of Wisconsin

The use of radiation probes to image tissues in the human body has progressed through an extraordinary evolution in the past three decades. Beginning with transmission computed tomography in the 1970s, this evolution has included real-time ultrasound, emission computed tomography, magnetic resonance imaging and digital radiography. These advances have recently yielded major improvements in imaging such as multi-detector transmission computed tomography, functional magnetic resonance imaging, dual imaging modalities built on a common platform, and image-guided intervention. These improvements and others have accelerated the usefulness of imaging methods in the early detection, definitive diagnosis, and effective intervention of a wide spectrum of diseases and disabilities. They also have led to increases in radiation doses to patients and the population, an issue of major concern to physicists and physicians. At this time there are four major frontiers for research in medical imaging: (1) molecular imaging; (2) functional imaging; (3) multi-modality imaging; and (4) information management. These research frontiers, together with the use of sophisticated imaging technologies in clinical practice, offer rich professional opportunities for physicists.