

Future applications in medical imaging

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Medical physics, particle physics, astrophysics, and other major branches of physics share a very broad technology common platform in their research and development of the respective instrumentation in these fields. Medical imaging often benefits greatly from advances made in particle physics, especially in the area of radiation detection technologies. For example, silicon photomultiplier (SiPM), developed first by and for high energy physics, has enabled revolutionary changes and created new potentials for novel medical imaging system designs unattainable previously. Fast electronics and data sciences advances in particle physics have also facilitated many quantum leaps in new medical imaging systems development, their innovative uses and breakthrough applications. Medical imaging also provides an ideal prototype platform for the very-large scale system planning, design, construction, testing and validation. These interactive and synergistic advances present unique opportunities for innovative developments of novel systems and future applications in medical imaging, such as modular, compact, application-specific, transformable and other innovative system designs for multi-modality, quantitative, and combined structural and molecular imaging applications, especially those in positron emission tomography (PET), single-photon emission computed tomography (SPECT), X-ray computed tomography (CT), digital X-ray, etc.

Presenter: Prof. CHEN, Chin-Tu (Chicago Univ.)

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