

4CS21-2021-000129

Abstract for an Invited Paper  
for the 4CS21 Meeting of  
the American Physical Society

### **Nuclear Science: from Fundamental Physics to Medical Technology**

CYNTHIA KEPPEL, Thomas Jefferson National Accelerator Facility

Discoveries and technological advances spurred by the demands of nuclear physics research find applications in many disciplines, including providing benefit to society through the treatment and diagnosis of disease. An overview of the connection between nuclear physics and medicine will be presented, with some emphasis on landmark and recent technological developments. As an example, proton radiation therapy is a precise form of radiation treatment for cancer. Due to the characteristic Bragg peak associated with ion energy deposition, proton therapy provides the radiation oncologist an improved method of treatment localization within a patient, as compared with conventional radiation therapy using X-rays. This can be accomplished only in concert with advances in tumor identification and localization, patient motion and positioning, treatment planning and evaluation, and a host of supporting technologies that can leverage nuclear physics detection and data processing techniques