

Introduction to Medical Physics and the Light Matter Reactions that Govern Radiation Imaging, Therapy, and Shielding
9:30-10:45am, Tuesday, Oct. 8, 2019, Science 103

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Justin Walker is a clinical Medical Physicist at Texas Oncology in Paris, Texas. Justin first became interested in physics while working with radar in the United States Navy. Upon completion of his military service he majored in physics at Texas A & M University Commerce. While in Commerce, Justin was an undergraduate researcher with Dr. Bao-An Li studying the nuclear equation of state. Justin received his master's degree in Medical Physics at the University of Toledo where his research was devoted to developing QA procedures for VMAT treatments. He has taken part in the commissioning of two state of the art nuclear accelerators. First the commissioning of a Varian TrueBeam at the University of Toledo and most recently the commissioning of an Elekta VersaHD at the Avera Cancer Institute. When not working, Justin enjoys kayaking, sailing, and spending time with his wife and daughter.

Abstract

The discovery of the x-ray ushered in an explosion of interest in the medical field to apply this discovery to various fields of medicine. While many valuable uses for radiation in medicine have been found, many dangers of their use exist. Physicists were very soon needed to help separate fact from fiction in the application of radiation and have become an indispensable part of radiation therapy, medical imaging, and nuclear medicine. Medical physicists have crucially relied on the work of radiation and nuclear physicist to help better the applications of radiation in medicine. In particular, the discovery and characterization of light to matter interactions such as the photo electric effect, Compton scattering, and pair production have been integral in helping medical physicist image, treat, and diagnose patients. Some of the key uses of these phenomena and others will be discussed and how understanding of these phenomena have led to better patient care illustrated.