Commentary

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Common Training Methods in Observing and Practicing Physics Plan Reviews

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Description

Our developed Brachytherapy computer code for high Dose Rate validated the mechanics of photon and electron interactions.The developed code used multiple physics libraries to compare the photon cross-section, comparing the results to theoretical and experimental findings. The results from the Livermore library were in good agreement with those from the experimental cross-section and Klein-Nishina.The measurement of the first scattered electron range within 1 mm and 2 mm for two therapeutically relevant materials has significant implications for the interpretation of the kernel dose spikes observed in previous research.A prospectively approved study was used to collect responses from 70 program directors, with a response rate of 70%.The purpose of physics plan reviews was chosen by all respondents as being patient safety.94% of those polled said that during a residency program, physicists should first receive training in physics plan reviews.Ninety-nine percent of respondents offer residents training in physics plan reviews.With varying degrees of independence, residents from 57 programs (81 percent of those surveyed) perform physics plan reviews as part of clinical practice, but residents from 13 programs (19 percent of those surveyed) do not.The majority of respondents employ the following methods of training:use a checklist (80%), observe staff physicists (96%) and actual patients for supervised reviews for training or clinical practice (93%)Even though 71% of respondents would use simulation plans with embedded errors, only 19% of programs currently do so.Program directors of accredited therapeutic medical physics residency programs in North America participated in a voluntary, anonymous online survey.The purpose of the survey was to find out if and how residents are trained in physics plan reviews.The Colorado Multiple Institutional Review Board granted approval to this study prior to the distribution of the survey.The survey began in September 2018 and remained open for one month.70 program directors responded to the survey out of the 100 invitations sent, representing 70% of therapeutic medical physics programs accredited by CAMPEP.Program directors could choose to respond or not answer at all.As a result, the completion rate ranged from 97% to 98%.23 program directors all together.

Observing and Practicing Physics Plan Reviews

Training residents in physics plan reviews is highly valued by program directors. Currently, the majority of programs teach residents how to review physics plans. Observing and practicing physics plan reviews are the most common training methods, but simulation plans with embedded errors are also being used. As part of clinical practice, resident participation in physics plan reviews varies, necessitating effective training strategies.Information.The authors would like to thank the program directors of therapeutic medical physics residency programs that are accredited by the Commission on Accreditation of Medical Physics Education Programs for voluntarily completing the survey in this study. Additionally, we would like to thank the 2017 Teacher's Scholars Program cohort at the University Of Colorado Academy Of Medical Educators for their numerous discussions and helpful suggestions regarding this educational research project. Prostate-specific membrane antigen is a transmembrane protein that is mostly expressed on the prostate epithelium in prostate cancer. Background, clinical data, patient selection, side effects, and the resources needed to administer lutetium-177 prostate-specific membrane antigen in a research setting or as standard of care if approved by the US Food and Drug Administration are all discussed in this review. Radiation oncologists and medical physicists are well-suited to play an integral role in the delivery of targeted radionuclide therapeutics and the monitoring of treatment response as key members of a multidisciplinary care team. Understanding fundamental principles of radiobiology and physics is required for targeted radionuclide therapeutics. In order to produce radionuclides that can be used in medical applications, it is necessary to have precise knowledge of nuclear data. This study frames the accessibility and shortage of normalized atomic information for the development of promising clinical radionuclides, zeroing in on the gas pedal course. Dual-mode imaging and targeted radionuclide therapy are two examples of theranostic applications for which the data are taken into account. There is a discussion of the current state of nuclear data, publication trends for nuclear data, and additional requirements for the production of promising theranostic/

therapeutic radionuclides using accelerators. An understanding of the accelerator-based production of promising radionuclides in a carrier-free form for theranostic medical applications is anticipated from this work.Both natural and man-made processes produce neutrons in the environment.Cosmic rays and their secondary particles interact with ground and atmosphere nuclei to form neutrons in nature. IN addition, storm electric discharges, spontaneous fission, and reactions in the soil all produce neutrons. Several radioisotopes in the soil's chain of uranium and thorium decay by -emission, and some alpha particles have energies high enough to trigger reactions in soil nuclei.Despite the small number of geoneutrons, their characterization is useful for science.A model of the spectrum of geoneutrons is presented in this work.

Utilizing Pairs of Thermoluminescent Dosimeters

This model was used as a source term to estimate neutron fluence and absorbed doses in sensitive organs using Monte Carlo techniques. Two hybrid BOMAB phantoms, one filled with air and the other with tissue, included cells from sensitive organs. The small number of geoneutrons and the fact that they are mixed with cosmic ray neutrons make it difficult to measure their spectrum on the ground. Utilizing pairs of thermoluminescent dosimeters in two water-filled tanks, one buried in the ground and the other on the floor, two straightforward experiments were carried out with the intention of demonstrating the presence of geoneutrons. An evaporation model was fitted to the geoneutron spectrum.The absorbed doses in the sensitive organs depend on the neutron spectrum that reaches the cells, the density, and the elemental composition of the organs and the phantom. Neutron fluences vary at each sensitive organ based on cell size and position in relation to the floor. There are more thermal neutrons in the buried detectors than there are at the ground surface.