AbstractID: 11205 Title: ImaSim, an Animated Tool for Teaching Imaging

Purpose: To enhance the teaching and the self study of diagnostic and radiotherapy photon imaging by the creation of an interactive educational software package (SP) based on a simulation environment. Various imaging modalities found in a radiology or radiation oncology department are included in the SP, namely conventional kV planar imaging, MV portal imaging, CT imaging and cone beam CT imaging. **Materials and Methods:** The SP aims at faithfully reproducing the physics behind these modalities while keeping the operation simple and straightforward. Simulated geometries are split into three parts in a modular approach: (1) source geometry, (2) object geometry and (3) detector geometry. (1) kV simulations are based on a validated theoretical model while MV outputs are obtained from the literature. Photons simulated fall into the energy range encompassing radiology and radiation oncology (1 keV - few MeV). (2) They are transported through user created virtual three-dimensional objects of various materials. Photon attenuation is modeled, while scattering is ignored to reduce calculation times. (3) Virtual detectors, with various energy responses are used to collect photons. The user can interactively vary many parameters. **Results:** The SP enables a user to quickly demonstrate and study principles associated with the creation of a radiological image in a classroom or in a self-learning setting. Simulations are managed via an aesthetically appealing and intuitive user interface that simplifies user control to facilitate the learning process. Many imaging phenomena can be studied with the aid of the SP, namely the heel effect, focal spot blurring, contrast vs. photon energy, CT and CBCT reconstruction, backprojection filtering, etc. The SP will be made available to the community by early 2010. **Conclusion:** This work, by rendering accurate image creation easily accessible, has the potential to enhance textbook based teaching and heighten student interest in medical photon imaging.