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Monte Carlo and numerical study of pumping K_α resonance fluorescence in high-Z nanovehicles for enhancing radiation therapy MAXIMILLIAN WESTPHAL, Biophysics Graduate Program, The Ohio State University, SULTANA NAHAR, Department of Astronomy, The Ohio State University, ANIL PRADHAN, Biophysics Graduate Program, Department of Astronomy, Chemical Physics Graduate Program, The Ohio State University — Using the Monte Carlo code GEANT4 developed by CERN as well as a custom code called PHOTX, we have studied fluorescence and Auger electrons in a variety of nanoparticles as a method to improve tumor irradiation. We used GEANT4 to simulate photons from quasi-monochromatic, monochromatic, and traditional broadband medical X-ray sources interacting with heavy element nanoparticles designed to enhance X-ray absorption [1]. Nanoparticles were composed of gold, platinum, or gadolinium, were varied in size from 2-20 nm, and were varied in shape including rods, spheres, and cubes. We also have made developments to the code PHOTX to better implement Rabi floppings in order to determine intensities needed to pump K_α resonance fluorescence in high-Z nanovehicles [2].
[1] M. S. Westphal et al., Phys. Med. Biol, 62: 6361-6378, 2017.
[2] S. N. Nahar and A. K. Pradhan, JQSRT, 155: 32-48, 2015.

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