Abstract Submitted
for the CAL11 Meeting of
The American Physical Society

**Geant4 Microdosimetry for Simulation of Dose Enhancement in vivo at Orthovoltage Energy**[1] NICOLE ACKERMAN, Physics Dept, Stanford University, MAGDALENA BAZALOVA, EDWARD GRAVES, Radiation Oncology, Stanford University School of Medicine — Dose-enhanced radiotherapy utilizes high-Z materials at a tumor site to increase the local dose from external beam radiotherapy. This effect is due to the increased cross section from the photoelectric effect and the production of Auger electrons. Many past simulations calculated dose in millimeter-scale voxels and ignored heterogeneities in concentration as well as sites of dose deposition at the cellular scale. We develop a cellular-scale Monte Carlo model using Geant4 to predict the dose enhancement in a variety of scenarios. Gold, tungsten, and iodine are simulated in both in vitro and in vivo geometries. We vary the concentration of the contrast agent both internal and external to the cell, and we measure dose only in the nuclear volume, where DNA damage occurs.

[1]NA is supported by the Weiland Family and DARE Fellowships.

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Date submitted: 29 Sep 2011 Electronic form version 1.4