

Abstract Submitted
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A Comparative Study of Different Monte Carlo Modeling Techniques for Proton Dose in Biological Materials¹ DAN FRY, WILFRED SEWCHAND, JOHN O'CONNELL, Walter Reed Army Medical Center, Radiation Oncology, Washington, DC 20307 — We have performed a comparison of the Monte Carlo simulation tools SRIM, PTRAN, and GEANT 4.7.0. The comparative parameters were chosen according to the degree of flexibility, ability to handle complex simulation geometries and physical processes modeled. Proton depth-doses in water have been compared with experimental measurements at 72 MeV, 110 MeV 158.5 MeV and 250 MeV. At the lowest incident proton energy all tools are in agreement with measurement. With increasing energy, SRIM underestimates the entrance and plateau dose. PTRAN and GEANT consistently predict the measured depth-dose over all energies simulated. Comparison was also done by simulating the depth-dose distribution in aluminum, tissue equivalent plastic (A-150) and graphite. The entrance (D_0) and peak doses (D_m), and the FWHM σ_{50} were simulated with both SRIM and GEANT at incident proton energies of 70 MeV, 100 MeV, 150 MeV, 200 MeV and 250 MeV. Comparison was made with the extended PTRAN-X code results of Palmans *et al.* (Phys. Med. Biol., 42, 1175, 1997). Neither SRIM nor GEANT are in agreement with PTRAN-X. Differences range from a few to over 100%.

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