

A systematic analysis of Monte Carlo generated phase space distributions (PSDs) for use as the input for dose calculation systems has been undertaken. The purpose is to determine the approximations that can be made and the limitations of the use of the calculated data for dose calculations. Using the Monte Carlo code BEAM, based on EGS4, the photon modes of the Varian 2100C accelerator have been modeled. The results indicate that the energy fluence at isocenter for the largest field sizes is significantly effected by the scattered radiation and radiation passing through regions of indeterminate geometry, such as the edge of the flattening filter. The photons that scatter in the primary collimator, flattening filter, and jaws have a low energy component which contributes significantly to the dose at the surface of phantoms and a higher energy component whose depth dose properties are similar to that of the direct beam. The analysis of the type to be presented is expected to improve our understanding of the transport of radiation through the components of the treatment machine and the air column and allow the validation of approximations and assumptions used to accelerate Monte Carlo simulations of dose deposition in patients without compromising accuracy.