

ASSESSMENT OF EGS4 FOR Sr-Y 90 INTRAVASCULAR BRACHYTHERAPY DOSIMETRY

The purpose of this work is to examine the accuracy and applicability of EGS4/PRESTA system for dose calculation in intravascular brachytherapy (IVBT) using Sr-Y 90 source. Such an examination is necessary because of the potential limitation of the multiple-scattering algorithm used in EGS4 for electron transport when applied to very small geometric region (small source size and scoring regions). We examined the effects of each of the EGS4 transport parameters on the accuracy and efficiency. (1) For dose spatial resolution of 0.1 mm or coarser, good accuracy can be achieved when the cutoff kinetic energy of electrons and photons is set to 0.01 MeV. (2) Limiting the energy loss per electron step (ESTEPE) did not affect significantly on accuracy. Thus, one may use larger ESTEPE or no ESTEPE control to gain efficiency without sacrificing accuracy as long as PRESTA is turned on. (3) Similar independence of AE (the lowest energy for secondary electrons) is also observed for AE in the range of 0.521- 0.661 MeV. An attempt is also being made to examine the adequacy of the multiple-scattering algorithm for smaller region and interface encountered in IVBT by using a single scattering scheme. More results will be presented.