En route to implementing (EGS4) Monte-Carlo simulation in the *DOSIGRAY* treatment planning system, we have assessed the effect of voxel size, photon energy, electron energy cutoff (ECUT) and the fractional energy loss per electron step (ESTEPE), on the CPU time. The *Usercode* DOSXYZ has been employed with and without PRESTA. The voxel sizes were varied from cubic side dimensions of 1.25 mm to 20.0 mm, for a 6MV spectrum, 5.0 cm square field, $2x10^7$ histories and 20 x 20x 30 cm^3 water phantom. The hardware was a dual PII Pentium (2 x 266MHz) with g77 compiler.

For a given uncertainty σ, in the calculated dose, the CPU time, T, was found to be inversely proportional to the voxel volume to a good approximation, i.e $T \propto 1/V$, for ECUT=0.7 MeV, no PRESTA and SMAX=5.0 cm.

Comparison of the CPU times with and without electron transport indicates the CPU time spent tracking photons + electrons versus tracking photons only. The ratio $CPU(h\nu+e^-)/CPU(h\nu)$ was found to increase dramatically with photon energy yielding values of 1.2, 4.0, and 6.2 at monoenergetic photon energies of 1.0, 10.0 and 25 MeV, respectively.

The exclusion of PRESTA reduces the computational time by ≈20%, for default ESTEPE. The choice of ESTEPE has a significant effect on the CPU; this was found to be 4.5 and 5.7 times less, at 2.0 and 10.0 MeV respectively, for default ESTEPE vs. ESTEPE = 0.01. Thus a relatively high ESTEPE value is indicated, provided that the physics is right.

The work was supported by a grant from DOSIGRAY, Paris.