A new version of the HZETRN code capable of simulating HZE ions with either laboratory or space boundary conditions is currently under development. It is based on recent improvements in the Green’s function approach to ion beam transport. In this approach an asymptotic expansion is used to simplify the transport of high charge and energy ions for broad beam applications in the laboratory and space. The solution of the lowest order asymptotic term is then related to a Green’s function for energy loss and straggling coupled to nuclear attenuation providing the lowest order term in a rapidly converging Neumann series for which higher order collisions terms are related to the fragmentation events including energy dispersion and down shift. It a recent report the first Neumann correction was accurately evaluated over the saddle point whose width is determined by the energy dispersion and located at the down shifted ion collision energy. The second Neumann correction was also evaluated but in a procedure that required numerical integration. We now exhibit an accurate analytical approximation, that is computationally more efficient than the numerical integration used previously. The new approximation is constructed by using the first Neumann correction to simplify of the second correction term which is then evaluated by an application of the mean value theorem and a second saddle point approximation.

In Figures I and 2 a comparison is made between the new approximation and the results obtained by numerical integration for the O(16,8) and Li(7,3) fragments from a Ne(20,10) beam on Aluminum at 600 MeV/amu.

Fig. 1. Second generation O(16,8) fragment flux at various depths.

Fig. 1. Second generation Li(7,3) fragment flux at various depths.