Energy Loss of Proton and Alpha particles in Different Media*

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The rates of energy loss for various projectiles are essential in many applications and they are not readily or adequately available either experimentally or theoretically for various projectiles incident on wide range of media. The radiation attenuation and penetration factor of incident charged particles in matter especially in medicine require a detail understanding of the dynamics of energy loss [1]. A full understanding of radiation damage provides not only the fundamental knowledge but also various tools to manipulate materials for nuclear applications. Moreover, this also helps to assess the effects of radiation on living tissues.

We report a simple semi-empirical model to evaluate the stopping power cross sections for H^+ and He^{++} for a wide range of stopping media (Z=2 to 10) and incident energy ranging from threshold to about 2.5 MeV/u. Using Dirac-Hartree-Fock-Slater [2] self-consistent field calculations, we compute electron density function accurately. We compared our results with the experimental and SRIM-simulated results [3]. Fig. 1 compares our calculated stopping power cross sections for various targets for the energy range $0.01<E<10$ MeV with experimental and other theoretical values.

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