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Effective energy loss per electron-ion pair in proton aurora

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Abstract. Effective energy loss per electron-ion pair produced, $<xi>(E_0)$, as a function of a particle's initial energy has been obtained for proton transport in the atmosphere. The influence of some transport parameters on the shape of $<xi>(E_0)$ has been studied. Comparisons with the case of electron transport and with other results were made. It has been shown that: 1. for $E_0 > 1$ keV, $<xi>(E_0)$ varies within the range 30-36 eV; 2. as E_0 increases the value of $<xi>(E_0)$ tries to attain an asymptotic value that is the same as for electrons (≈ 35 eV); 3. $<xi>(E_0)$ strongly depends on the average energy of secondary electrons, but the energy distribution of secondary electrons is not as important. The range of possible changes in $<xi>(E_0)$ associated with discrepancies in cross sections has been obtained.

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