



## Proton acceleration in the Earth's magnetotail

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Ion beams with energies of the order of several tens of keV are frequently observed in the Earth's magnetotail. Here we consider two possible acceleration mechanisms, the cross tail electric field  $E_y$  and the stochastic acceleration due to the electromagnetic fluctuations present in the magnetotail. A test particle simulation has been performed in order to reproduce the interaction between charged particles and electromagnetic fluctuations and the constant dawn-dusk electric field,  $E_y$ , in the magnetotail current sheet. Electromagnetic perturbations are generated by random oscillating "clouds" moving in the  $x$ - $y$  plane. Protons are accelerated via a stochastic Fermi-like process and, by varying the features of the electromagnetic fluctuations, along with the value of the normal magnetic component and other physical parameters, we can explain a range of energetic ion observations.