



## **Acceleration of ions by high-velocity Alfvén waves in the underdense space plasma**

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We discuss the  $\chi$  - dependence of the field aligned ponderomotive acceleration of ions under the action of Alfvén waves. The dimensionless parameter  $\chi = c_A/c$ , where  $c_A$  is the Alfvén velocity, varies in the wide range, and consequently the properties of Alfvén waves are varied drastically. It is shown that the high-velocity Alfvén waves ( $\chi \sim 1$ ) accelerate the charge particles much more effectively than the low-velocity waves ( $\chi \ll 1$ ). This pertains to the nonresonant and resonant mechanisms of acceleration equally. The energization processes in the magnetosphere are discussed briefly in view of an overall picture of  $\chi$  - dependence of the ponderomotive forces induced by the Alfvén waves. In particular, it is argued that the energization of heavy ions above the auroral oval is located in the number of thin filamentary structures like small scale field aligned plasma density cavities detected by Freja satellite. The work was supported by the INTAS 01-0013 and RFBR 03-05-64361.