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Determining the transverse structure of Alfvén waves recorded by the Van Allen Probes satellites by means of the "phase portraits" technique

Aleksandr A. Vlasov[1] , Daniil A. Kozlov[1]

[1] Institute of Solar-Terrestrial Physics, Siberian Branch of the Russian Academy of Sciences

a.vlasov@mail.iszf.irk.ru

The study of the transverse structure of Alfvén waves observed by Van Allen Probes satellites using the method of the "phase portraits" (construction of the phase difference between the magnetic field components) has been carried out. The first event was observed by the RBSP-A satellite on 23 October 2012 at 22.00-22.30 UT. It is shown that the observed oscillations can be explained as resonant poloidal Alfvén waves generated on two resonant surfaces located on both side of the local maximum in the radial distribution of the Alfvén velocity. The polarization of the waves between these resonant surfaces changes from poloidal to toroidal. The second event was detected by the RBSP-A satellite on the same day at 19.12-20.24 UT. This event can be interpreted as a transverse Alfvénic resonator. Comparison between the theoretical and satellite transverse components of the magnetic field and their "phase portraits" shows good agreement.

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