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Mode Converting Alfvén Waves from Magnetic Reconnection Enhancing the Energy Source for the Aurora Borealis HARSHA GURRAM, JAN EGEDAL, University of Wisconsin - Madison, WILLIAM DAUGHTON, Los Alamos National Laboratory — Previous studies have concluded that the Hall magnetic field structures generated during magnetic reconnection are carried away by kinetic Alfvén waves (KAW) for distances $\sim 10R_e$. However, from our study of Hall field profiles obtained from domain $200d_i \times 30d_i$, we observe that the large scale structure is carried by waves which are super-Alfvénic ($\sim 2V_a$) near the X-line where they are generated, but as they travel into the exhaust for $\sim 5R_e$ their propagation velocity decreases and become Shear Alfvénic ($\sim 1V_a$). Owing to the dispersive nature of KAW as they propagate their wavenumber, $k_\perp$, decreases, corresponding to a mode conversion into Shear-Alfvén waves(SAW). This mode conversion, away from the X-line becomes important as it eliminates the energy attenuation of 99% due to Landau damping, expected when KAWs propagate towards Earth without conversion. The SAWs permit a substantial transfer of Poynting flux to the auroral regions, enhanced by a factor of 10^3 above previous estimates. This may lead to particle acceleration and help account for auroral brightening at locations magnetically conjugate to spacecraft observations.

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