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**Kinetic Alfvén waves in three-dimensional magnetic reconnection**

JI LIANG, School of Physics and Optoelectronic Technology, Dalian University of Technology, Dalian 116024, China, YU LIN, XUEYI WANG, Department of Physics, Auburn University, Auburn, AL, USA — Ion kinetic structure of magnetic reconnection in a current sheet is investigated with a 3-D hybrid code for cases with various X-line lengths and guide fields. It is found that kinetic Alfvén waves (KAWs) are generated in the reconnection. In the cases in which the $X$-line is so long to extend through the entire domain, quasi 2-D configurations are present. For a current sheet with a zero guide field, the KAWs are found near the separatrices, whereas under a finite guide field $B_G$, they are also seen at the reconnection bulge. In the cases in which the $X$-line has a finite length $\xi$, with $\xi \sim 10d_i$ and $d_i$ being the ion inertial length, the wave perturbations are of a highly 3-D nature. Waves with a dominant $k_\perp \rho_i \sim 1$ are found propagating outward along magnetic field lines from the reconnection region with a slightly super-Alfvénic velocity. The structure, polarization relations, and damping of KAWs are examined. The dependence of wave propagation on $B_G/B_{x0}$ is also investigated, where $B_{x0}$ is the antiparallel magnetic field component. The critical length of $X$-line for the generation of 3-D like structures is found to be $\xi_c \lesssim 30d_i$.

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