Abstract Submitted for the DPP16 Meeting of The American Physical Society

Three-dimensional two-fluid investigation of 3D-localized magnetic reconnection and its relation to whistler waves YOUNG DAE YOON, PAUL M. BELLAN, California Institute of Technology — A full three-dimensional computer code was developed in order to simulate a 3D-localized magnetic reconnection. We assume an incompressible two-fluid regime where the ions are stationary, and electron inertia and Hall effects are present. We solve a single dimensionless differential equation for perturbed magnetic fields with arbitrary background fields. The code has successfully reproduced both experimental and analytic solutions to resonance and Gendrin mode whistler waves in a uniform background field. The code was then modified to model 3D-localized magnetic reconnection as a 3D-localized perturbation on a hyperbolic-tangent background field. Three-dimensional properties that are asymmetric in the out-of-plane direction have been observed. These properties pertained to magnetic field lines, electron currents and their convection. Helicity and energy have also been examined, as well as the addition of a guide field.

> Young Dae Yoon California Institute of Technology

Date submitted: 07 Jul 2016

Electronic form version 1.4