

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Three-dimensional electromagnetic strong turbulence: II. Wave packet collapse and structure of wave packets during strong turbulence<sup>1</sup>**

DANIEL GRAHAM, PETER ROBINSON, IVER CAIRNS, University of Sydney, OLAF SKJAERAASEN, ProsTek, Institute for Energy Technology — Large-scale simulations are performed by numerically solving the three-dimensional (3D) electromagnetic Zakharov equations, focusing on individual wave packet collapses and on wave packets forming in strong turbulence. The structures of the Langmuir, transverse, and total electric field components of wave packets during strong turbulence are investigated over a range of  $v_e/c$ . For  $v_e/c < 0.17$  strong turbulence is approximately electrostatic and wave packets have very similar structure to purely electrostatic wave packets. For  $v_e/c > 0.17$  transverse modes become trapped in density wells and contribute significantly to the structure of the total electric field. At all  $v_e/c$  the Langmuir energy density contours of wave packets are predominantly oblate. The transverse energy density contours of wave packets are predominantly prolate, with the major axis being perpendicular to the major axes of the Langmuir component. This results in wave packets becoming more nearly spherical as  $v_e/c$  increases, and in turn generating more spherical density wells during collapse.

<sup>1</sup>This work was supported by the Australian Research Council and an Australian Postgraduate Award.

Daniel Graham  
University of Sydney

Date submitted: 29 Jun 2011

Electronic form version 1.4