

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Shell Pellet Experiments on DIII-D¹ E.M. HOLLMANN, A.N. JAMES, J.H. YU, University of California-San Diego, N. COMMAUX, T.C. JERNIGAN, Oak Ridge National Laboratory, T.E. EVANS, D.A. HUMPHREYS, G.L. JACKSON, P.B. PARKS, E.J. STRAIT, W. WU, General Atomics — Injection of hollow shell pellets filled with a dispersive payload is a possible method for rapid shutdown of future large tokamaks to avoid wall damage during disruptions. Preliminary shell pellet experiments have been performed in the DIII-D tokamak by firing small (OD \sim 2 mm) polystyrene shells filled with either pressurized (10 atm) argon gas or with boron powder into quiescent discharges. Pellet slowing from 350 m/s down to 100 m/s was observed, which is not well-understood at present. Using the measured pellet velocity, the observed pellet burn up at $r/a \sim 0.5$, appears consistent with ablation rate calculations. Successful delivery and rapid (< 15 ms) dispersal of the pellet payloads into the plasma core was observed. Negligible plasma current contraction or MHD onset were seen as a result of the shell burn up in the plasma edge, consistent with calculations. Planned experiments with large (OD \sim 1 cm) shell pellets will also be discussed.

¹This work was supported by the US DOE under DE-FG02-07ER54917, DE-AC05-00OR22725, and DE-FC02-04ER54698.

E.M. Hollmann
University of California-San Diego

Date submitted: 21 Jul 2009

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