Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Energy Transformation between Forms in the Big Red Ball[1] CARY FOREST, MIKE CLARK, JAN EGEDAL, DOUG ENDRIZZI, KEN FLANAGAN, SAM GREESE, JASON MILHONE, JOE OLSON, ETHAN E. PETERSON, JOHN WALLACE, ROGER WALEFFE, ELLEN ZWEIBEL, University of Wisconsin, Madison — Astrophysical and Space plasmas are often characterized by quasi-stationary magnetized plasmas which are both pressure dominated ($\beta 1$) and flow dominated ($M_A = V/V_A > 1$), and yet still behave as ideal plasmas with fluid and magnetic Reynolds numbers being large so that magnetic fields are frozen into the flowing, often turbulent plasma ($Rm \gg 1, Re \gg 1$). Such natural plasmas are almost always converting energy of one form into another. For example, dynamos convert plasma flow energy into magnetic fields; magnetic reconnection controls how magnetic energy is released into plasma flow and heat. The Big Red Ball is a device at the core of flexible new user facility (the Wisconsin Plasma Physics Laboratory—WiPPL) designed to study a range of astrophysically relevant plasma processes in this unique regime. This talk will describe the unique capabilities of BRB, along with several experiments, in both operating and planning stages, that illustrate its possibilities a range of astrophysical experiments, including self-exciting dynamos, collisionless magnetic reconnection, plasma accretion via the magneto-rotational instability [MRI], jet stability, stellar winds and shocks.

[1]This work was supported by the DoE and the NSF.

Cary Forest
University of Wisconsin, Madison

Date submitted: 14 Jul 2017 Electronic form version 1.4