Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Physical interpretations of permutation entropy scaling analyses of turbulent space and laboratory fluids[1] ARIEL ROCK, HOLDEN PARKS, Swarthmore College, DAVID SCHAFFNER, Bryn Mawr College, MICHAEL BROWN, Swarthmore College — Statistical properties of various turbulent laboratory and natural (magneto)fluids are investigated using both complexity measures of ordinal pattern distribution[2] and temporal increments. The systems analyzed are solar wind $|B|$ time series from the Cluster satellites, streamwise velocity time series from the Johns Hopkins University Corsin Wind Tunnel, and $|\dot{B}|$ time series from the Swarthmore Spheromak Experiment (SSX) MHD wind tunnel. Plasma in the SSX wind tunnel has parameters $B \approx .2$T, $n \geq 10^{21}$ m^{-3}, and $T_i \geq 20$ eV. By comparing the permutation entropy and Jensen-Shannon complexity with the behavior of the structure functions derived from the intermittency analysis, the connections between the complexity measures and dissipation mechanisms can be determined. The Corsin Wind Tunnel velocity data is used to compare the statistical signatures of dissipation in conventional hydrofluids with that seen in magnetofluids.

[1]Work supported by DOE OFES and NSF CMSO.
[2]Rosso *et al.*, PRL **99**, 154102 (2007).

Ariel Rock
Swarthmore College

Date submitted: 24 Jul 2015 Electronic form version 1.4