***PRL Cover Letter:***

This manuscript details the result of a novel experiment conducted on the MHD wind-tunnel configuration of the Swarthmore Spheromak Experiment which clearly demonstrates a relationship between the magnetic helicity of the plasma and the level of turbulent intermittency observed in magnetic field fluctuations, a connection that has not been previously studied. The turbulent characteristics of this highly magnetized, dense plasma has been examined using frequency-domain spectral analysis and probability density function of increments techniques and shows that variation in the externally controlled magnetic helicity results in an increase in intermittency—increased kurtosis of PDFs, but not in the spectral character of the fluctuations (i.e, no change in the spectral indices). Furthermore, these results can be coupled to trends in observed signatures of magnetic reconnection on the experiment, indicating a possible connection between the observed intermittency and the structure of reconnection sites in the plasma. This result has implications for both observational space plasmas as well as laboratory plasmas, and can be used to make comparisons to solar wind turbulence, help validate turbulence simulation, and provide a laboratory base for exploring theoretical models of MHD turbulence. Establishing this research vein and highlighting the unique laboratory-based experimental techniques can help spur further integration of laboratory MHD turbulence research with *in-situ* or remote measurements and high-resolution simulations.

***PRL Statement:***

To be publishable in PRL a paper must do at least one of the following:

* Substantially advance a particular field;
* Open a significant new area of research;
* Solve a critical outstanding problem and therefore pave the way for notable progress in an existing field;
* Be of singular appeal to all physicists.

Please tell us in **100 or fewer words** why your paper is suitable specifically for PRL.

In the past, MHD turbulence studies have relied on *in-situ* satellite measurements and high-resolution simulations, but few laboratory experiments have contributed to the development of MHD turbulence theory. The results of this manuscript show for the first time an MHD turbulence analysis of laboratory plasma that is physically relevant to solar wind. The paper details how variation of a controllable parameter—magnetic helicity—can modify the intermittency and also indicate a possible connection between intermittency and magnetic reconnection. The results provided have implications for space and laboratory plasma and can spur further integration of laboratory study into MHD turbulence research.

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