Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Topological Waves in Plasmas and Analogs to Topological Insulators JEFFREY PARKER, University of Wisconsin - Madison, BRAD MARSTON, Brown University, STEVE TOBIAS, University of Leeds, ZIYAN ZHU, Harvard University — A topological understanding of matter is not only deepening our knowledge of physics, but also leading to novel practical devices and applications. Nontrivial topology in bulk matter has been linked with the existence of topologically protected interfacial states. While these concepts were originally developed in electronic structures and photonic systems, recent advances have demonstrated that continuum fluid systems can support topological waves. We extend these ideas to plasmas and show that a gaseous plasmon polariton (GPP), an electromagnetic surface wave existing at the boundary of magnetized plasma and vacuum, has a topological origin that arises from the nontrivial topology of magnetized plasma. Moreover, we show that the GPP may be found within a gapped spectrum in present-day laboratory devices, suggesting that platforms are currently available for experimental investigation of topological wave physics in plasmas. Experiments to confirm the existence of this wave would open a new frontier in the exploration of the physics of topological waves in plasmas.

J. B. Parker, J. B. Marston, S. M. Tobias, Z. Zhu, Phys. Rev. Lett. 124, 195001 (2020)

Jeffrey Parker
University of Wisconsin - Madison

Date submitted: 27 Jun 2020 Electronic form version 1.4