



Ronald E. Hatcher
Science on Saturday Lecture Series
16 February 2019

**Magnetic explosions: From space plasmas to
fusion energy**

Dr. Fatima Ebrahimi
Research Physicist
Princeton Plasma Physics Laboratory

ABSTRACT:

Our universe is immersed in magnetized plasma, electrically conducting ionized gas. The sun as a natural laboratory for plasma physics provides inspiring as well as challenging problems, including rapid dynamical processes, magnetic explosions on its surface, and the replication of its core reaction, fusion energy, on earth in a lab. I will present some basics of the rearrangement of the magnetic field topology, which energizes many processes in natural and fusion plasmas. I will demonstrate the instrumental role of this topological magnetic rearrangement, which enables an innovative technique for producing current in fusion plasmas.

BIOGRAPHY:

Dr. Fatima Ebrahimi is a Principal Research Physicist at the PPPL Theory Department and an Affiliated Research Scholar at the Department of Astrophysical Sciences, Princeton University. She has many years of experience in theoretical and global computational extended magnetohydrodynamics (MHD) with wide applications to laboratory fusion and astrophysical plasmas. Her main research interests are MHD stability in fusion plasmas, momentum transport, dynamos, and magnetic reconnection in laboratory fusion and astrophysical plasmas. She has written many papers over a wide range of topics, published in a number of leading peer-reviewed journals. She served as a member of APS-DPP Executive Committee (2013-2016) and a member of the Executive Committee for the International Sherwood Fusion Theory Conference (2014-2017). She is an elected executive committee member of the APS Topical Group in Plasma Astrophysics (GPAP), 2018-2021, and program committee member for U.S. Magnetic Fusion Research (MFR) Strategic Directions, 2017-2018.



Dr. Ebrahimi received her Ph.D. in Plasma Physics from the University of Wisconsin-Madison. Upon receiving her Ph.D., she was a Research Associate at the Alfvén Laboratory, Royal Institute of Technology in Sweden for one year, and then was a Research Associate and Research Scientist with the National Science Foundation (NSF) Frontier Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas (CMSO) at the University of Wisconsin. Before joining the theory department at PPPL in 2013, she was a Research Assistant Professor at the University of New Hampshire.