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RESEARCH NEWS FROM PPPL



Steven Cowley

Welcome to Quest

As the newly arrived director of the Princeton Plasma Physics Laboratory (PPPL), it is my pleasure to welcome you to the Summer 2018 issue of Quest, our annual research magazine. On returning to PPPL, where I studied as a graduate student and worked as a staff scientist some 25 years ago, I am excited to see the tremendous progress being made in a broad range of scientific projects throughout the Laboratory. The Laboratory is still the vibrant place that first captivated me in the summer of 1981.

I am delighted that our flagship fusion facility, the National Spherical Torus Experiment Upgrade (NSTX-U) is now under repair. It is the most powerful spherical tokamak in the world and promises to reach fusion conditions in a compact design. If our predictions hold it could provide a route to lower the cost and scale of future fusion reactors. Certainly, it is going to yield some of the most interesting results in fusion research.

We have entered an era when computer simulations of the enormously complex behavior of plasmas have begun to reproduce and explain the observations — PPPL is at the forefront of that revolution. In this edition of Quest you will see a wonderful example of the progress that has been made: the first supercomputer simulation of the transition to the high confinement mode. I am personally looking forward to interacting and learning from the Princeton theorists — it is a revolution I am eager to be part of.

PPPL is not only a fusion lab. Our research sheds new light on the function of plasma, the state of matter that comprises 99 percent of the visible universe, in everything from the fabrication of microchips to the creation of northern lights, solar flares, the origin of magnetic fields in the universe, and the potential for life on distant planets.

PPPL, managed by Princeton University for the U.S. Department of Energy, is a collaborative national center for fusion and plasma research and the only national laboratory focused on these issues. I invite you to read and learn about the wide-ranging research findings coming from this Laboratory over the past year, and to share in our excitement about these advances in plasma science and the control of fusion energy — advances that benefit not just the United States, but the world. I also value your feedback, so please let me know your thoughts [here](#).