

# Blazing like the Sun



David Hammer

J. Carleton Ward, Jr., Professor of Nuclear Energy Engineering and Professor of Electrical Engineering

## CURRENT RESEARCH

### Using pulsed power machines to generate high energy density plasmas

Imagine the intensity of energy exuding from the sun. If the same kind of energy, or fusion power, is harnessed on Earth, we would be able to replace fossil fuels with clean "central station power." Therefore, studying science that may one day enable fusion on Earth is important. The breakthroughs that researchers might experience during this process are absolutely invaluable. Dr. David Hammer, of Cornell University, studies the fundamental science underlying high energy density paths to fusion, a path that involves achieving energy density comparable to that at the center of the sun. Using an innovative pulsed power machine, his lab can achieve states of matter that don't exist otherwise on Earth. By researching these states of matter, Dr. Hammer hopes to gain key insights about high energy density plasmas and how to manipulate them. The discoveries that Dr. Hammer finds in his lab may provide a basis for much larger laboratories and experiments to create practical means of producing power and energy on earth from the fusion of hydrogen into helium.

Dr. Hammer's laboratory together with associated theoretical and computer simulation research is in "steady state" operation at present, producing new scientific results a few times a year that are reported at conferences and published in peer-reviewed journals. Because of the lab's extraordinary method of turning normal matter into nothing like that on Earth, the students who have their Ph.D.'s from Dr. Hammer's laboratory are much sought after by national laboratories and companies like Raytheon. Although not directly studying fusion, Dr. Hammer and his lab are contributing to fusion with their fundamental science research, learning everything they can about...

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## AFFILIATION



Cornell University

## EDUCATION

- Ph.D., in Applied Physics, 1969, Cornell University
- Fulbright Fellow, in 1965, University of Leeds, England
- B.S., in Physics, 1964, California Institute of Technology

## AWARDS

- Electrical and Computer Engineering Ruth and Joel Spira Excellence in Teaching Award, 2007
- Cornell College of Engineering Teaching Award, 1998 and 2006
- Cornell IEEE Professor of the Year Award, 2006
- McCormack Award for Excellence as an undergraduate advisor, 2005
- IEEE Plasma Science and Applications Committee Award, 2004

## RESEARCH AREAS

Technology, Materials Science / Physics, Clean Energy, Space

## FUNDING REQUEST

Support Dr. Hammer and his team as they continue to build foundations to make new discoveries in a variety of high energy density plasma configurations. Yearly, a graduate student needs \$100K for tuition, stipend, and other expenses to perform experiments and report results; postdocs and senior scientists require proportionally more. With new diagnostic instruments costing \$5K-\$300K and the pulsed power machine \$800K for operation, maintenance, and personnel, your donations will help the team push deeper into high energy density science.