



Department of

# Physics and Astronomy

WASHINGTON STATE UNIVERSITY

2018-2019

## Distinguished Colloquium Series

### Dr. Michael Campbell

University of Rochester

Thursday, April 11, 4:10 pm

Webster Hall, Room 17



### “Laser Direct Drive Status and Future Plans”

The laser direct drive approach is one of the three principle approaches to achieve fusion ignition and gain in inertial fusion. Significant progress has been made over the past year with a tripling of the fusion yield and a scaled (to MJ energies such as that available on NIF) pressure-confinement time product 75% of that required for ignition. The improvements in fusion performance were obtained using a novel statistical model that mines the extensive data base of Omega. Significant challenges remain however in quantifying and mitigating laser driven plasma instabilities that reduce the target coupling and generate energetic electrons that can preheat the fuel and reduce the compression. To address this challenge, a novel experimental platform, advanced diagnostics and simulation tools have been established at LLE and an advanced laser concept that has the potential to expand laser parameter space for all laser fusion approaches is under development. In addition to expand the opportunities for high energy density science, a new facility that includes two 30 Petawatt lasers has recently been proposed and will also be presented.

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**Biography:** Dr. Campbell is an internationally known expert in inertial fusion, high-energy-density physics, high-power lasers and their applications, and advanced energy technologies including Generation IV nuclear fission reactors and biofuels. He has won numerous awards including the Department of Energy's E. O. Lawrence Award, the American Nuclear Society's Edward Teller Award, the American Physical Society's John Dawson Award, the Department of Energy's Excellence in Weapons Research Award, and the Leadership Award of Fusion Power Associates. He is a Fellow of the American Physical Society and the European Institute of Physics. He has published over 100 articles in scientific journals and holds five patents including the design of the first laboratory x-ray laser. He has given numerous invited and plenary talks at both national and international conferences. He is the originator of the Inertial Fusion Science and Applications Conference.

Dr. Campbell has been a member of numerous committees providing advice and strategy, including the National Academy of Sciences, Los Alamos National Laboratory, Berkeley National Laboratory, University of Texas, the National Research Council of Canada, and Lockheed Martin Corporation. He serves on the Board of Evans and Sutherland Corporation and has worked in various scientific and leadership positions at both federal laboratories and the private sector including Lawrence Livermore National Laboratory, General Atomics, Logos Technologies, and Sandia National Laboratories. He has received his degrees from the University of Pennsylvania, Princeton University, and the University of Western Sydney.

*Please meet our guest speaker at a reception to follow, 5:00 – 6:30 p.m.  
in the foyer on floor G above the lecture hall*

Host: Christopher Keane