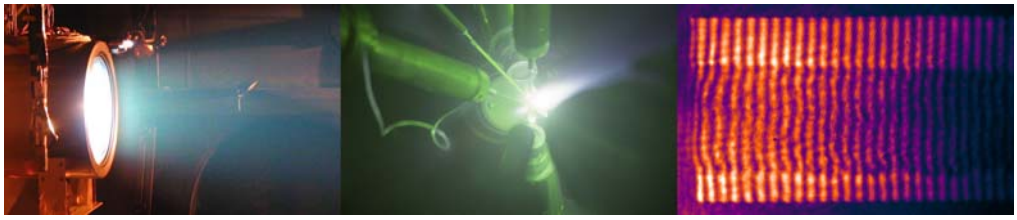

Michigan Institute for Plasma Science and Engineering Seminar

Compressing Waves in Plasma

Prof. Nathaniel J. Fisch

Princeton University

Wednesday, 19 January 2011 - 4:00 pm
Room 1303 EECS Building

Abstract

This talk reviews wave compression in plasmas. The next generation of laser intensities may well be obtained using plasma-based effects to compress laser pulses, since using plasmas overcomes the limitations of materials in conventional compression gratings. The compression effect occurs through irradiating plasma by a long pump laser pulse, carrying significant energy, which then releases its energy to a short counter-propagating pulse through a resonant nonlinear Raman process. However, for very different applications, waves might also be compressed in plasma through adiabatic changes in time of the plasma medium. In particular, waves with a small group velocity, such as Langmuir waves, might be compressed in a plasma as the plasma itself is compressed. As the plasma wave grows, the ratio of the field energy to the plasma kinetic energy changes, which can in turn govern a variety of interesting plasma processes.

About the Speaker: **Nathaniel J. Fisch is Director of the Program in Plasma Physics and Professor of Astrophysical Sciences at Princeton University. He also serves as Associate Director for Academic Affairs at the Princeton Plasma Physics Laboratory. Dr. Fisch received his PhD from MIT in 1978. His professional interests include plasma physics with applications to nuclear fusion, plasma processing, plasma devices, lasers, and astrophysics; plasma thrusters, laser-based plasma accelerators, and atomic radiation in plasmas; petroleum refining; statistical inference and pattern recognition. In 2005, Prof. Fisch received the American Physical Society James Clerk Maxwell Prize for Plasma Physics.**