



**Wednesday**  
**January 30, 2013**  
**4:00 pm**  
**Room 1017**  
**Dow Building**

**Prof. Jeffrey A. Hopwood**  
Tufts University, Medford, MA

## **Microplasmas Excited by Microwave Frequencies**

The study of microplasmas offers an intriguing direction for plasma science. The atmospheric pressure microplasma is typically not in thermal equilibrium. This coexistence of hot electrons with cool gas suggests many applications for these microplasmas where thermal arcs are not appropriate due to excessive heat loads, discharge lifetime limitations, and high power consumption. As is the case with other plasmas, a microplasma may be sustained by DC, AC, RF or microwave power. Due to the rapid quenching of electron energy at high pressures, however, only DC or the highest drive frequencies will result in a non-transient plasma. With this motivation, this talk will discuss the basic physics of microwave microplasmas and then describe some applications of the technology including chemical analysis of natural gas samples and deposition of diamondlike carbon films.

**About the Speaker:** Jeffrey Hopwood received a PhD in electrical engineering from Michigan State University in 1990 in the area of ECR plasmas. He is currently a Professor of Electrical and Computer Engineering at Tufts University, Medford, Massachusetts. Professor Hopwood has co-authored 56 peer-reviewed journal articles and holds 9 patents in plasma devices and processes. In the 1990's he worked with low pressure processing plasmas at IBM's T.J. Watson Research Center and then at Northeastern University. He now focuses on microplasma physics and microplasma device design combining expertise in plasma, microwave circuits, and applied physics. His current work is funded through industrial support as well as grants from the NSF, DARPA, AFOSR and the US Department of Energy.