Prof. Amy Wendt

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Noninvasive Measurements of Plasma Parameters Via Optical Emission Spectroscopy

The spectrum (intensity vs. wavelength) of light emitted by plasmas contains a wealth of information about the state of the plasma. Diagnostic characterization of low temperature plasmas for engineering applications leads to physical insights into plasma behavior, can aid in development of predictive models, and may be used in real-time process control. The spectrum of emitted light from the plasma (optical emission spectroscopy, or OES) is sensitive to the electron density and electron energy distribution (EEDF) and can be monitored through a viewport without perturbing the plasma. This presentation will provide an overview of a collaborative effort at UW-Madison to explore the practical capabilities and limits of OES as a diagnostic for low-pressure plasmas. Results will be presented for inductively and capacitively coupled plasmas in rare gases and mixtures of argon with diatomic gases, with highlights including vacuum ultraviolet (VUV) photon production, concentrations of charged and excited state neutral species, and detection of non-Maxwellian EEDFs.

About the Speaker: Amy Wendt is a professor of Electrical and Computer Engineering at UW-Madison. Her research focus is ionized gas discharges for technological applications. Understanding of the behavior of plasmas, how they interact with materials substrates and implications for process and system design are the primary goals of her research. Her research group conducts experimental studies with activities including diagnostic development, plasma source design and process development. She is also principal investigator for “Society’s Grand Challenges for Engineering as a Context for Middle School STEM Instruction,” an NSF-supported research effort to develop core math and science curriculum with the goal of increasing interest and awareness of engineering, especially among girls and other under-represented groups. She is the co-Director of the Women in Science and Engineering Leadership Institute at UW-Madison, a member of the UW-Madison University Committee and of the National Research Council Plasma Science Committee, and is currently the Chair of the Gaseous Electronics Conference Executive Committee. Professor Wendt received MS and Ph.D. degrees in Electrical Engineering and Computer Science from UC Berkeley and a B.S. in Engineering from Caltech.