Differentiating sources of effective ion temperature in gas-puff z-pinch plasmas using Thomson scattering

**Abstract:** With pulsed power technology facilitating laboratory high-energy-density plasma physics studies at universities, and international collaborations working to build and test fusion reactor concepts, our understanding of high-energy-density plasmas and their applications continues to expand. Knowledge of plasma conditions (specifically electron and ion temperatures) is critical for determining heat transfer rates, fusion rates, energy partitioning (into kinetic, thermal, etc.) and dissipation, and the effects of plasma instabilities. This talk will cover neon gas-puff z-pinch plasmas, created by a 1 MA, ~200 ns rise-time pulsed power machine, at and around stagnation time. Thomson scattering, both time-resolved and spatially-resolved, yields ion and electron temperature. Multiple methods of fitting the Thomson spectra show that the presence of velocity gradients in the plasma at stagnation contribute to the effective ion temperature, implying that the measured ion temperature is not due solely to thermal ions.

**Biography:** Sophia Rocco is a PhD student (Electrical and Computer Engineering) at Cornell University in the Laboratory of Plasma Studies. She received her B.Sc. in Physics from the University of California at Santa Cruz, where her research involved the fabrication and characterization of thin-film copper-zinc-tin sulfide solar cells. Sophia made the shift to plasma physics when she realized that it was the only field where developing a lightsaber (and a fusion reactor) might be more than just a fantasy. Her research focuses on the partitioning of energy in gas-puff z-pinch plasmas from implosion through stagnation.

**Date:** February 16, 2018 (Friday)
**Time:**
  - Refreshment at 12:00 pm
  - Talk begins at 12:15 pm
**Place:** Phillips 233

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