



**PHYSICAL SEMINAR**  
**MONDAY,**  
**FEBRUARY 29, 2016**  
**4:00 P.M.**  
**HUTCHISON HALL 473**  
**DEPARTMENT OF CHEMISTRY**  
**UNIVERSITY OF ROCHESTER**

**GUEST SPEAKER:**  
**PROFESSOR**  
**DUSTIN FROULA**  
**UNIVERSITY OF**  
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**LABORATORY FOR**  
**LASER**  
**ENERGETICS**

## “Raman Amplification of High Power Laser Pulses ”

**Abstract:** Exploring the physics at the laser-intensity frontier is an exciting challenge. Present-day petawatt-class lasers provide on-target focused intensities of  $10^{22}$  W/cm<sup>2</sup>. Raman amplification opens a potential route for focused intensities in the range  $10^{23}$  to  $10^{25}$  W/cm<sup>2</sup> as well as providing a cost-effective route for high-energy petawatt laser pulses. Raman amplification is a process by which a long energetic pump pulse transfers its energy to a counter-propagating short seed pulse through a resonant electron plasma wave. A recent comprehensive series of large-scale multidimensional particle-in-cell simulations has identified the optimal parameter space for this interaction. At the Laboratory for Laser Energetics (LLE), we plan to perform a careful and systematic experimental investigation, aided by state-of-the-art numerical modeling, into the physics of Raman amplification and the associated laser-plasma instabilities that are notorious for limiting the efficient energy extraction. (Professor Froula received a secondary appointment as an Assistant Professor in the Physics in Astronomy Department in 2013.)

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