

Announcing the Final Examination of Mrs. Danielle L. Reyes for the degree of Master of Science in Physics

Date: March 30, 2017

Time: 12:00 p.m.

Room: CREOL 102

Dissertation title: Plasma Dynamics of Laser Filaments

Laser filamentation is a complex phenomenon occurring for pulses with peak power above a critical value. A filament is a dynamic self-guided structure characterized by several unique qualities, which include a beam with a high-intensity core surrounded by an energy reservoir, a weakly ionized plasma channel, and supercontinuum generation. Several of the proposed applications for filamentation utilize the plasma channel, such as for assisted electric discharge and microwave guiding. However, filament properties are highly influenced by the physical conditions under which they are formed. A host of studies have been conducted to further characterize filaments, but much work still remains in order to understand their complex behavior. This work presents an accurate and direct measurement of the electron density based on an interferometric technique. The impact of different initial parameters on filament spatio-temporal dynamics in air is investigated, concentrating primarily on their influence on the plasma. For comparison of the experiment with theory, the plasma decay is modeled by a system of kinetic equations that takes into account three-body and dissociative electron recombination reactions.

Outline of Studies:

Major: Physics

Educational Career:

B.S., 2015, University of Central Florida

Committee in Charge:

Dr. Martin C. Richardson

Dr. Michael Chini

Dr. Romain Gaume

Approved for distribution by Martin C. Richardson, Committee Chair, on March 22, 2017.

The public is welcome to attend