Announcing the Final Examination of Omar Rodriguez-Valls for the degree of Master of Science

Time & Location: April 28, 2010 at 1:00 PM in Creol 102
Title: Characterization and Modeling of a High Power Thin Disk Laser

High power lasers have been adapted to material processing, energy, military and medical applications. In the Laser Plasma Laboratory at CREOL, UCF, high power lasers are used to produce highly ionized plasmas to generate EUV emission. This thesis examines the quality of a recently acquired high power thin disk laser through thermal modeling and beam parameter measurements.
High power lasers suffer from thermally induced issues which degrade their operation. Thin disk lasers use an innovative heat extraction mechanism that eliminates the transverse thermal gradient within the gain medium associated with thermal lensing. A thorough review of current thin disk laser technology is described.
Several measurement techniques were performed on a high power thin disk laser. The system efficiencies, spectrum, and temporal characteristics were examined. The laser was characterized in the far-field regime to determine the beam quality and intensity of the laser.
Laser cavity simulations of the thin disk laser were performed using LASCAD. The induced thermal and stress effects are demonstrated. Simulated output power and efficiency is compared to those that have been quantified experimentally.

Major: Electrical Engineering

Educational Career:
Bachelor's of Electrical Engineering, BS, 2008, University of Central Florida

Committee in Charge:
Dr. Martin Richardson, Chair, Creol/Electrical Engineering
Dr. Peter Delfyett, Creol/Electrical Engineering
Dr. Aravinda Kar, Creol/Electrical Engineering

Approved for distribution by Dr. Martin Richardson, Committee Chair, on April 13, 2010.

The public is welcome to attend.