



**Project Title:**

Laser-Generated Plasmas with Multiple Chemical Species: Simulations and Experiments

**Project Reference Code:**

UAB-Camata

**Host Facility:**

The University of Alabama at Birmingham

**Host Facility Location:**

1720 2nd Ave South  
Birmingham, AL 35294  
<https://www.uab.edu/>

**Project Description:**

Low temperature plasmas generated by laser ablation exhibit rich chemistry and spatiotemporal phenomena. The chemical diversity of ablation targets and variety of gas backgrounds have long been recognized as excellent for creating novel thin film materials. Computer simulations of this process for single-element plumes is well established, but accurate descriptions of plasmas containing numerous chemical species are in their infancy. The Quantum Materials Synthesis laboratory at the UAB Department of Physics is seeking one undergraduate intern to perform computer simulations and carry out electrical probe measurements on multi-species plasmas generated during laser irradiation of solids. Materials of interest include iron-based superconductors based on the FeSeTe system and high dielectric constant oxides such as strontium titanate. No prior experience in plasma simulations or measurements is required. The intern will learn the fundamentals of plasma physics and laser synthesis of materials and receive training in the use of our in-house developed software for multi-species plasma simulation and electrical probe measurements of the plume angular distribution. Actual measurements will be performed under the supervision of experienced personnel. The intern will work closely with UAB researchers conducting both computer simulations and experimental studies, and participate in the integrated interpretation of findings.

**Disciplines:**

Applied Physics, Physics, Chemistry, Engineering, Electrical Engineering, Materials Science and Engineering, Mechanical Engineering, Chemical Engineering, Computer Science, Electrical and Computer Engineering

**Is U.S. citizenship required to participate in this project?**

No

**Internship Location and COVID-19 related Backup Plan**

Due to the COVID-19 pandemic, we are preparing multiple options to ensure that the internship will take place. We are looking at least at an in-person, hybrid, and fully virtual option. For any in-person component we will ensure that there is adequate physical spacing between workspaces, following all university cleaning protocols.

**Name(s) of Mentor(s) and contact information:**

Renato Camata ([camata@uab.edu](mailto:camata@uab.edu))

**Internship Coordinator/ HR manager:**

Charita Cadenhead ([charita@uab.edu](mailto:charita@uab.edu))



---

The name and contact information of personnel at the host facility is provided for further assistance with questions regarding the host facility or the project.

Interns will not enter into an employee/employer relationship with the host facility. No commitment with regard to later employment is implied or should be inferred.