

**Project Title:**

Development of a laser interferometer to measure plasma density

**Project Reference Code:**

UAH-Xu2

**Host Facility:**

The University of Alabama in Huntsville

**Host Facility Location:**

301 Sparkman Dr.  
Huntsville, AL 35899  
<https://www.uah.edu/>

**Project Description:**

The goal of this project is to build and test a laser interferometer to obtain time resolved measurements of plasma density in low temperature plasmas. Laser interferometry uses a low power laser beam that is split into two beams. One beam passes through the plasma, and the other through open air. The beam that passes through the plasma interacts with the electrons in the plasma and undergoes a phase shift. When the two beams are recombined, the phase shift can be measured and used to calculate the electron density. At UAH, we are studying various plasmas at low and high pressures. A laser interferometer would be a very useful non-intrusive optical diagnostic. The system would use a standard HeNe laser, photo-diode detectors, mirrors, and a Quadrature phase detector. The student would assist with the setup of the diagnostic, measurement of different plasma, and analysis of the data.

**Disciplines:**

Engineering, Physics

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

No

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

The internship location is the University of Alabama in Huntsville. 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. If there's no in-person at all, the equipment can be taken "home" to either the grad student or PI's home and experiment conducted there with atmospheric pressure plasma. The data can be sent to the ALPIP student then.

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

Gabe Xu ([gabe.xu@uah.edu](mailto:gabe.xu@uah.edu))

**Internship Coordinator/ HR manager:**

Dana Waller ([dsw0012@uah.edu](mailto:dsw0012@uah.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.



## Alabama Plasma Internship Program



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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.