



Project Title:

Effect of transient pulsed plasma on detonation wave strength

Project Reference Code:

UAH-Xu1

Host Facility:

The University of Alabama in Huntsville

Host Facility Location:

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

Project Description:

This project will use the linear detonation tube and/or the rotating detonation engine at UAH to study the effect of high voltage pulsed plasma discharges on the behavior of the detonation wave. Detonation is a supersonic combustion such as in explosions (deflagration is the more typical subsonic combustion like in candles or camp fires). In a detonation engine, supersonic detonation waves are created to compress and heat the fuel to produce work and thrust. These engines are being studied for applications to rocket engines, jet engines, and ground based gas turbines. For this project, the student will work with graduate students to study the effect a plasma discharge has on the detonation strength. The plasma is low enough energy to avoid igniting the fuel, but high enough to cause dissociation of the fuel molecules, which can create a more combustible mixture. The project will be experimental and use ion probes, thermocouples, and pressure transducers to measure the detonation wave as a function of the plasma input conditions. Other tasks may include studying the plasma itself prior to being added to the engine, or studying the effect of the discharge on liquid fuel sprays.

Disciplines:

Engineering

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 the lab is open, but undergrads are not allowed, then it's possible to have the grad students do the experiment and send the data to the undergrad to analyze.

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

Gabe Xu (gabe.xu@uah.edu)

Internship Coordinator/ HR manager:

Dana Waller (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



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.