

**Project Title:**

Understanding spatiotemporal plasma dynamics in MDPX using fast imaging

Project Reference Code:

Auburn-Thakur 2

Host Facility:

Auburn University

Host Facility Location:

380 Duncan Drive

Auburn, AL 36832

<https://www.auburn.edu/>

Project Description:

At sufficiently high magnetic fields in the capacitively-coupled, rf generated plasmas in the Magnetized Dusty Plasma Experiment (MDPX) at Auburn University we have observed the formation of elongated filaments, which represents localized nonuniformities in the plasma. The plasma filaments exhibit a wide variety of spatial and temporal dynamics. For certain ranges of neutral pressure, power and magnetic fields, filaments with multiple rotating spiral arms have been identified using visible imaging from the top of the machine. These are typically due to instabilities of the original vertical plasma column, producing such azimuthal spirals with multiple arms. High resolution imaging and fast imaging can shed light on the spatial and temporal nature of these structures, respectively. In this project, we will work on detailed camera data analysis to identify different filamentary structures, investigate the nature of the spiral arms, understand spatiotemporal patterns, and use statistical methods to characterize these filamentary structures. The imaging techniques such as 2-D azimuthal mode decomposition and time series-based data analysis tools such as Fourier transforms can be applied to various other systems as well.

Disciplines:

Physics, Engineering, Mathematics

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

NO

Internship Location and COVID-19 related Backup Plan

The internship location is at Auburn University. We are planning for an in-person internship. However, due to the continuing COVID-19 pandemic, we are preparing additional options to ensure that the internship will take place, such as a hybrid or fully virtual option.

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

Saikat Chakraborty Thakur, (szc0199@auburn.edu)

Internship Coordinator/ HR manager:

Allen Landers (landdeal@auburn.edu)



Alabama Plasma Internship Program



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.