

**Project Title:**

Solar cycle dependence of turbulence power anisotropy at 1 au

Project Reference Code:

UAH-Adhikari

Host Facility:

The University of Alabama in Huntsville

Host Facility Location:

301 Sparkman Dr.

Huntsville, AL 35899

<https://www.uah.edu>

Project Description:

Anisotropy is one of the important properties of solar wind turbulence. In the presence of a large-scale magnetic field, turbulence power in direction perpendicular to the mean magnetic field is different from that in the parallel direction. Anisotropy has been studied via i) the power spectral indices of the perpendicular k_{\perp} and parallel k_{\parallel} wavenumbers (Horbury et al. 2008; Podesta 2009); ii) turbulent power in directions parallel and perpendicular to the mean magnetic field (Montgomery 1982; Matthaeus et al. 1990; Bieber et al. 1996), and iii) the correlation length in directions parallel and perpendicular to the mean magnetic field (Dasso et al. 2005). In this project, we calculate the variance anisotropy of the energy in forward and backward propagating modes, the fluctuating kinetic and magnetic energies at 1 au using OMNI magnetometer and plasma data sets over 22 years to study the solar cycle dependence of turbulence power anisotropy in solar wind fluctuations. This study will tell us how the 2D and slab turbulence quantities vary from solar minimum to solar maximum.

The student will analyze both magnetometer and plasma data from OMNI and calculate the 2D and slab turbulence quantities at 1 au over 22 years. This project offers a student the opportunity to learn data analysis techniques.

Disciplines:

Physics, Math, Computer Science, Space Science

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

No

Internship Location and COVID-19 related Backup Plan

The internship location is at the University of Alabama in Huntsville. 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:

Laxman Adhikari (la0004@uah.edu)



Alabama Plasma Internship Program



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.

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.