Faculty Name:

Carlos Paz-Soldan

Faculty Email:

carlos.pazsoldan@columbia.edu

Lab:

Columbia Plasma Physics Laboratory

Project Title:

Basis Functions to Measure 3-D Magnetic Fields in Tokamak Plasmas

Description:

The objectives of this work are to provide a learning opportunity for plasma physics and applied mathematics in fusion research as well as to produce an improved experimental analysis tool for the DIII-D National User Facility community. The successful applicant will be asked to contribute to the spatial fitting of quasi-stationary non-axisymmetric magnetic perturbations using measurements from the “3D” magnetics diagnostic set in the DIII-D tokamak [E. Strait Rev. Sci. Instrum. 2006, Strait Phys. Plasmas 2015]. Tokamaks are designed to be donut shaped plasma columns that are symmetric going (toroidally) around the donut. These fits are used to assess the growth of unstable modes as well as probe the response to forced distortions that break this symmetry of the tokamak [E. Strait Rev. Sci. Instrum. 2016]. Such mode fitting has thus far used simple cylindrical-coordinate Fourier decomposition, which is a good choice for a donut with a circular cross-section. The DIII-D tokamak, however, is “D” shaped in cross-section. This project will look at ways of improving the basis functions of the fit to more naturally describe the expected asymmetries in this oddly shaped plasma. This student will contribute directly to magnetics analysis tools used at DIII-D, with the objective of demonstrably improving an important tool used by experts in cutting edge fusion science research. Students will also generally assist with other Columbia Plasma Physics Lab initiatives. More information can be found at https://plasma.apam.columbia.edu

** This position and others in Prof Paz-Soldan’s group have a common application **

** Please apply using the form https://forms.gle/viSUdEneLy66vFaZ6. Do NOT email the PI **

** Flexibility in project choice is welcome **

Location of Research:

On Site

# of hrs/week:

40

Department/Program:

Applied Physics and Applied Mathematics

Eligibility:

BS, First Year, BS, Second Year, BS, Third Year, MS

To apply, please contact:

Use the google form