Discontinuous Galerkin modeling of Scrape-Off Layer Turbulence

TESS BERNARD, FRANÇOIS WAELBROECK, CRAIG MICHOSKI, University of Texas at Austin — Turbulence plays an important role in determining the transport and heating of space, astrophysical, and laboratory plasmas. Modeling this turbulence is particularly challenging because of the ability of the plasma to support waves with disparate space-time scales as well as to generate both short and long wavelength through nonlinear processes. Using a discontinuous Galerkin code called ArcOn, turbulence in the Texas Helimak is modeled. The Helimak experiment at the University of Texas aims to model the conditions in the scrape-off layer (SOL) of fusion devices. Effective modeling of this region is very important because much of the thermal power in fusion devices flows through it to divertor plates that must survive the resulting erosion and redeposition. It has been shown that electric biasing in this region can be used to reduce and control turbulence. The Arcon code is used to simulate such potential biasing, with the goal of improving the theoretical understanding of this phenomena and its role in other fusion devices, in addition to the Helimak.

Tess Bernard
University of Texas at Austin