

Name: Ben Chapman

Host institution: Kyushu University

department: Research Institute for Applied Mechanics

Host supervisor name: Yusuke Kosuga

Email: bc661@alumni.york.ac.uk

The flows of most plasmas in the universe are turbulent, for instance, the origin of earth and sun's magnetic fields, the propagation of cosmic rays, and space weather are deeply linked to turbulence. On a laboratory scale, turbulence observed in magnetic fusion devices has a large impact on their performance and ultimately, the ability of the device to produce energy from fusion. This project involved analysis of existing data sets obtained from the in house linear plasma device "PANTA" at Kyushu university. A variety of turbulent phenomena are routinely observed in PANTA, such as drift wave turbulence - due to gradients in the plasma density, and sheared flow turbulence - due to the flow of plasma along field lines. By using bicoherence analysis, we were able to shed light on the nonlinear interactions between the waves excited as a result of these different types of turbulence, and the possible influence said interactions have for energy spreading. The beginnings of a search for the topical "Zonal flow" was undertaken, and more work is in progress in order to determine the possible existence of such flows in the PANTA device.

In addition to this, the new analysis techniques I learned in Japan have been applied to my wider work at Warwick. I was very happy to present some of the research I have done at Warwick in a group seminar at Kyushu, and I also embarked upon a small tour of Japan, through Tokyo, Nagoya, Kyoto, and Hiroshima, giving research presentations at Nagoya and Kyoto, staying in capsule hotels, and making time for sightseeing. The host stay was amazing, I had so much fun playing with the children and being bombarded with a continuous supply of food. During my time in Fukuoka I have had the pleasure of enjoying many museums, the beautiful surrounding areas, and plenty of "Nomihodai" with my research group...

Below is a photo of me with the children from the homestay program, Shiika-chan and Ritsuki-kun, the latter can speak better English than me!

