From April to July 2015 I performed a Master's internship at the Max Planck Institute for Plasma Physics in Greifswald, Germany, funded by Fusenet. This was an exciting time to be at the IPP, since the Wendelstein 7-X Stellarator was just being prepped for operation during this time. Until ITER starts its operation, W7-X will be the largest fusion device in the world; certainly a step up from typical stellarator experiments which tend to be much smaller than tokamaks.

My research was part of a preparatory effort by the IPP's ECRH group for W7-X's operation. One outstanding issue for W7-X is the fact that under some circumstances, the microwaves used for Electron Cyclotron Resonance Heating are not fully absorbed by the plasma and are in fact scattered across the vessel, where they can be absorbed by all in-vessel components, even those that are in principle not expected or designed to withstand any heat loads.

In order to design protection for diagnostics and the like, an accurate idea of the intensity of these stray microwaves is needed. In turn, to predict the level of stray radiation, amongst others, the reflectivity of the vessel wall must be known. My job was to design and optimize an experiment in which the reflectivity to stray microwaves can be measured.

The result is a set-up where microwaves are launched into a closed copper sphere, where the microwaves are scattered at each reflection with the wall, allowing a stray field to build up. When a test material is inserted inside the sphere, the measured drop in intensity is a measure for the material's absorption. With many tweaks and modifications, the accuracy of the set-up gradually improved during my stay in Greifswald.

I also learned a lot from the internship, personally. On the academic side, I learned a lot about microwaves (Gaussian beams, waveguides, absorption in plasma) as well as experimentation (designing experiments, interpreting and explaining results, and feeding this back to the experimental design). I also brushed up on some practical skills such as soldering and general tinkering.

Apart from my internship, Greifswald was a fun place to be. The environment was beautiful, and made for some nice hikes. As an example, I walked to the 'Königstuhl' (lit.: King's seat) one day, an impressive white cliff overlooking the North Sea. My visit was also just in time for the exciting bi-yearly 'Stud-U-Night' event, where all of the city's student clubs unite to throw one joint party.

All in all, my time in Greifswald was productive, fun, and 'gemütlich'!