
Contribution ID: **429** Type: **Invited Oral**

# Commissioning of the Wendelstein 7-X In Vessel Control Coils

*Wednesday 7 June 2017 16:00 (20 minutes)*

The magnet system of the stellarator fusion device Wendelstein 7-X (W7-X) is composed of three different groups of coil systems. The main magnetic field is created by a superconducting magnet system that is accompanied by two sets of normal conducting coil groups, the trim coils positioned outside of the cryostat and the control coils inside the plasma vessel.
The control coil system consists of ten 3D shaped coils, power supplies, cooling systems, high current feeds and an autonomous remote control system. The design of the ten individual power supplies is based on four-quadrant current converters using Mosfet-Transistors. They provide individual bipolar DC currents and a superposed common AC current of low frequencies for each coil. The coils are situated behind the baffle plates of the ten divertor units. They are fed with electrical power and cooling water by a plug in that is also sealing the vacuum conditions inside the plasma vessel from the ambient outside the machine. The magnetic field created by the control coils system allow for the correction of error fields, to influence the islands at the plasma boundary and for the sweeping of the separatrix, e.g. the point of the largest power position, across the divertor.
At the end of 2015 the installation of the control coil system was completed and the integral commissioning took place in parallel to the ongoing completion of W7-X. For the first time the control coils and their power supply were operated in conjunction with all auxiliary systems like the power distribution system, the high current feeds, the cooling system and the safety control system.
This paper describes the results obtained and experiences made during the integral commissioning of the control coil system, including the baking process in preparation for the first experimental campaign of W7-X.

## Eligible for student paper award?

No

**Author:** Mr FÜLLENBACH, Frank (Max-Planck-Institut für Plasmaphysik)

**Co-authors:** Dr RUMMEL, Thomas (Max-Planck-Institut für Plasmaphysik); Mr RISSE, Konrad (Max-Planck-Institut für Plasmaphysik); Mr VAN EETEN, Paul (Max-Planck-Institut für Plasmaphysik); Prof. BOSCH, Hans-Stephan (Max-Planck-Institut für Plasmaphysik); Mr CARLS, André (Max-Planck-Institut für Plasmaphysik); Mr HAAS, Matthias (Max-Planck-Institut für Plasmaphysik)

**Presenter:** Mr FÜLLENBACH, Frank (Max-Planck-Institut für Plasmaphysik)

**Session Classification:** W.OP1: Magnets

**Track Classification:** Magnets