

LESSONS LEARNED FROM FABRICATION AND ASSEMBLY OF WENDELSTEIN 7-X

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The next step in the Wendelstein stellarator line of IPP is the large superconducting device Wendelstein 7-X. Presently under construction in Greifswald, Wendelstein 7-X is a “fully” optimised stellarator, based on the concept of quasi-isodynamicity. It has been designed for consistent operation of long-pulse (3600s) reactor relevant plasmas. The stellarator magnetic field and all components have been designed to ensure stable, high-beta steady state operation with good confinement of both the thermal plasma and fast ions, thereby demonstrating the reactor potential of optimised stellarators.

One key element of the Wendelstein 7-X mission is to demonstrate steady-state operation at reactor relevant plasma conditions, as required for an economic fusion reactor. Steady-state operation is an intrinsic feature of stellarators, and therefore this device has fully superconducting coils. However, steady-state operation of fusion relevant plasmas is a complex task that is composed of both engineering and physics issues.

During the design and fabrication of the components of Wendelstein 7-X and also in the preparation and execution of the assembly of this device, a lot of experiences have been gained. This refers to technical issues in different fields, but also to organizational and management issues. An overview of the major experiences and the lessons that can be useful for other large engineering projects will be given in this presentation.