



IAEA FEC 2014

Contribution ID: 448

Type: **Poster**

Advances in the Physics Basis for the European DEMO Design

Wednesday 15 October 2014 14:00 (4h 45m)

In the European Fusion Roadmap ITER is followed by a Demonstration Fusion Power Reactor (DEMO), for which a conceptual design is now under development. The relevant physics knowledge need for the concept design analysis –referred to as DEMO Physics Basis –is incomplete. This contribution reports first results of a coherent effort to develop the DEMO Physics Basis, carried out by European experts. Based on an earlier assessment this program has been started in recent years and expanded in 2014 towards a more systematic and broader activity.

To give an example, the vertical stability of a DEMO plasma has been investigated. Especially for typical ramp-down conditions critical growth rates have been found. Furthermore employing a realistic feedback control system, the required installed power to control the ramp-down plasma after an initial perturbation has been found to be out of the acceptable range. In order to quickly resolve this, it is planned to start already at this stage searching for a stable ramp-down trajectory.

The program to develop the DEMO Physics Basis includes investigations in the areas of transport, MHD, fast particles, plasma wall interaction and disruptions. In this phase of the program it is essential to have an intense discussion with the international fusion science community on various aspects of DEMO modelling and extrapolation of experimental results to DEMO.

Country or International Organisation

Germany

Paper Number

PPC/P4-19

Author: Dr WENNINGER, Ronald (Max-Planck-Institut für Plasmaphysik)

Co-authors: Prof. FASOLI, Ambrogio (CRPP-EPFL); Dr SIEGLIN, Bernhard (Max-Planck-Institut für Plasmaphysik, EURATOM Association, Garching, Germany); Dr ANGIONI, Clemente (Max-Planck-Institut fuer Plasmaphysik, EURATOM Association, D-85748 Garching, Germany); Dr FABLE, Emiliano (Max-Planck-Institut für Plasmaphysik, EURATOM Association, Garching, Germany); Dr VILLONE, Fabio (Ass. EURATOM/ENEA/CREATE, DIEI, Univ. Cassino, Italy); Prof. JENKO, Frank (Max Planck Institute for Plasma Physics); Dr GIRUZZI, Gerardo (IRFM, CEA); Dr FEDERICI, Gianfranco (EFDA, Garching, Germany); Dr RAMOGIDA, Giuseppe (Associazione Euratom-ENEA sulla Fusione, C.P. 65-I-00044-Frascati, Rome, Italy); Prof. ZOHN, Hartmut (Max-Planck-Institut für Plasmaphysik); Dr ARTAUD, Jean-Francois (CEA, IRFM, F-13108St Paul-Lez-Durance, France); Dr GARCIA, Jeronimo (CEA IRFM); Dr AHO-MANTILA, Leena (VTT Technical Research Centre of Finland); Dr WISCHMEIER, Marco (IPP Garching); Dr MATTEI, Massimiliano (Ass. EURATOM/ENEA/CREATE, DIII, Seconda Università di Napoli, Naples, Italy); Dr BERNERT, Matthias (Max-Planck-Institut für Plasmaphysik, EURATOM Association,

Garching, Germany); Dr MAGET, Patrick (CEA, IRFM, F-13108St Paul-Lez-Durance, France); Dr ALBANESE, Raffaele (4Ass. EURATOM/ENEA/CREATE, Università di Napoli Federico II, Naples, Italy); Dr AMBROSINO, Roberto (Ass. EURATOM/ENEA/CREATE, Università di Napoli Parthenope, Naples, Italy)

Presenter: Dr WENNINGER, Ronald (Max-Planck-Institut für Plasmaphysik)

Session Classification: Poster 4