

# Implications of Uncertainties on the European DEMO design

*Friday, October 26, 2018 8:30 AM (4 hours)*

During the pre-conceptual design phase of fusion devices such as the European demonstration fusion power plant (DEMO), systems codes provide a fast evaluation of optimal design points and highlight high impact areas. However, determining or evaluating a design point at such an early stage comes with uncertainties in many of the design parameters. These uncertainties are both associated with the physics as well as the engineering basis of the European DEMO design.

This work applies an uncertainty quantification analysis to the 2017 pulsed European DEMO design using the PROCESS systems code. It assumes that DEMO will be built as suggested by the baseline and explores what implications the currently known physics and engineering uncertainties have on the expected performance parameters (net electric output and pulse length), while optimising the fusion gain  $Q$  or the pulse length. It furthermore compares the analysis of the conservative DEMO baseline design to the more advanced Flexi-DEMO option.

A more detailed single parameter analysis is clearly identifying high impact parameters. This is confirming previous investigations as well as revealing new areas that warrant deeper investigation.

## Country or International Organization

Germany

## Paper Number

FIP/P7-2

**Primary author:** Dr LUX, Hanni (CCFE, UKAEA)

**Co-authors:** Dr PATELLI, Edoardo (Institute for Risk and Uncertainty, University of Liverpool); Dr FEDERICI, Gianfranco (EUROfusion Consortium); Prof. ZOHN, Hartmut (Max-Planck-Institut für Plasmaphysik); Dr SICCINIO, Mattia (EUROfusion Consortium); Mr MORGAN, Max (CCFE, UKAEA and Institute for Risk and Uncertainty, University of Liverpool); Dr KEMP, Richard (CCFE); Dr MORRIS, William (Euratom/CCFE Fusion Association, UK); Prof. BIEL, Wolfgang (Forschungszentrum Juelich)

**Presenter:** Dr LUX, Hanni (CCFE, UKAEA)

**Session Classification:** P7 Posters

**Track Classification:** FIP - Fusion Engineering, Integration and Power Plant Design