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ELM and ELM-control Simulations

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Future devices like JT-60SA, ITER and DEMO require quantitative predictions of pedestal density and temperature levels, as well as divertor heat fluxes, to improve global confinement capabilities while preventing divertor erosion/melting in the planning of future experiments. Such predictions can be obtained from nonlinear MHD codes like JOREK, for which systematic validation against current experiments is necessary. In this paper, we show the validation of ELM simulations with JOREK using quantitative comparison against JT-60U experiments. Note this is the first JOREK validation of ELM simulations at exact Spitzer resistivity. In addition, we demonstrate the essential importance of the separatrix position, required for a successful agreement with experimental data. On the basis of this validation, we propose estimates of ELM size, ELM-induced divertor heat-fluxes, and pre-ELM pedestal pressure, for future JT-60SA scenarios.

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Primary author: Dr PAMELA, Stanislas (CCFE - UKAEA)

Co-authors: Dr DE LA LUNA, Elena (CIEMAT); Dr HUIJSMANS, Guido (ITER Organization); Dr URANO, Hajime (QST); Dr GARCIA, Jeronimo (CEA IRFM); Dr HOELZL, Matthias (Max-Planck-Institut für Plasmaphysik, Boltzmannstrasse 2, D-85748 Garching, Germany); Dr AIBA, NOBUYUKI (Japan Atomic Energy Agency); Dr FUTATANI, Shimpei (Department of Physics, Universitat Politècnica de Catalunya (UPC), Barcelona); Mrs SMITH, Siobhan (Culham Centre for Fusion Energy, Abingdon OX143DB, United Kingdom)

Presenter: Dr PAMELA, Stanislas (CCFE - UKAEA)

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