Contribution ID: **77** Type: **Oral (Plenary Session)**

Three-Dimensional Boundary Physics Aspects for the Development of Next Generation Divertor Concepts with Resonant Magnetic Perturbations

Tuesday 5 November 2019 09:00 (30 minutes)

Resonant magnetic perturbation (RMP) fields applied for control of edge-localized modes (ELMs) break the axisymmetry of the plasma boundary in tokamaks. With RMP fields applied, a striation of the divertor target heat and particle flux pattern is detected which proves existences of helical magnetic fingers reaching from the X-point outward to the divertor target. A threedimensional plasma boundary is formed, which potentially alters the divertor and plasma edge transport characteristics. In this contribution, a systematic assessment of the heat and particle flux pattern with RMP fields for various tokamaks around the world is presented and discussed with respect to future divertor scenarios expected for ITER and DEMO. Main points of the discussion will be (a) the 3D plasma transport, (b) indications for the relation to the plasma response and (c) the impact on the actual divertor recycling condition including scaling into detached divertor
regimes. The discussion will show that several open points exist to enhance the reliability of our capacity to extrapolate. The material will be presented to aid an subsequent open discussion of the relevance and impact these aspects for future devices.

Acknowledgement: This work was conducted as part of ITPA-DSOL task 37. As such, many colleagues from various devices will be involved, which will be listed as co-authors of the presentation if the contribution is selected.

Affiliation

Country or International Organization

United States of America

Authors: SCHMITZ, Oliver (University of Wisconsin - Madison, Department of Engineering Physics); JAKUBOWSKI, Marcin (Max Planck Institute for Plasma Physics)

Presenter: JAKUBOWSKI, Marcin (Max Planck Institute for Plasma Physics)

Session Classification: Implications of Applied 3D Fields

Track Classification: Divertors for DEMO and Reactors