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Boundary Modeling Integrated with RMP Plasma Response to Optimize ELM Suppression in KSTAR[1] HEINKE FRERICHS, JOHNATHAN VAN BLARCUM, OLIVER SCHMITZ, University of Wisconsin - Madison, JONG-KYU PARK, SEONGMOO YANG, PPPL, YUHE FENG, MPI Greifswald, HYUNGHO H LEE, NFRI, Republic of Korea, YOUNG-CHUL GHIM, WONJUN LEE, KAIST, Republic of Korea — Compatibility of divertor plasma detachment with application of resonant magnetic perturbations (RMPs) for control of edge localized modes (ELMs) is a key challenge for magnetic confinement fusion. The Korean Superconducting Tokamak Advanced Research (KSTAR) facility is equipped with a flexible set of perturbation coils that allow scanning of the operation space (phasing and amplitude of individual coil rows) and fine-tuning of the ELM control window for optimal heat load spreading. We discuss the modeling framework required for this endeavor: a 3D boundary plasma model (EMC3-EIRENE) linked with a magnetohydrodynamic plasma response model (GPEC, MARS-F, ...). We show that uncertainties in plasma response model parameters propagate to the boundary model resulting in significant changes to the magnetic footprint which determines heat loads. The boundary plasma model is extended to include low collisionality corrections to the classical parallel heat conduction (heat flux limit).

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Heinke Frerichs
University of Wisconsin - Madison

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