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Effect of RMPs on neutral fueling and exhaust in MAST[1]
KURT FLESCH, University of Wisconsin-Madison, JAMES HARRISON, ANDREW KIRK, Culham Centre for Fusion Energy, OLIVER SCHMITZ, IAN WATERS, University of Wisconsin-Madison, MAST TEAM — The application of resonant magnetic perturbations (RMPs) at MAST has been shown to cause density pump-out during discharges that have a particular MHD response. This occurs in L-mode as well as H-mode discharges, which also show edge localized mode (ELM) mitigation. An analysis of the changes in fueling and exhaust show that RMPs cause an increase in total fueling to the plasma, from D-alpha emission measurements, but also a significant drop in particle confinement time, from a 0-D single reservoir particle balance of the main ion species, such that there is a net particle pump-out. In order to more accurately calculate this change in recycling, a more detailed analysis of the measured D-alpha emission was done. Synthetic diagnostics were created using EMC3-EIRENE modeling results of these discharges as a plasma source for the ray tracing code CHERAB. The generated synthetic images were compared to the corresponding absolutely calibrated images from experiment to better constrain the experimental measurements. Results still show an increase in recycling flux during RMPs, but with a lessened effect, causing the calculated confinement time to be even lower.

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