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Simulations of plasma response to RMP with BOUT++ code BIN
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Lawrence Livermore National Laboratory — BOUT++ code is a framework which
developed to simulate 3-dimenisonal fluid equations in curvilinear coordinates (Dud-
son, et al., Computer Physics Communications, 2009). Here we developed an ideal
two-field model (vorticity and Ampere's law) to simulate the influence of resonant
magnetic perturbation (RMP) on the pedestal plasmas. The vacuum RMP field is
self-consistently calculated and included in the two-field model. The current sheets
at resonant surface are found, and the radial magnetic field distribution of vacuum
RMP and total magnetic field strength are compared. The influence of resistivity on
the current sheets is also studied in this model. Based on this work, the radial mag-
netic field perturbation includes the vacuum RMP component and plasma response
in the pedestal region is obtained. By applying the magnetic field perturbation
in the peeling-ballooning mode simulation, the influence of RMP on the pedestal
plasma could be studied in L-mode, H-mode and ELM discharges.

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