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Model of Tearing Mode Suppression by Resonant Magnetic Perturbations in a Tokamak[1] WENLONG HUANG, University of Science and Technology of China, PING ZHU, University of Science and Technology of China, University of Wisconsin-Madison — The conventional error field theory has been extended to model the interaction between tearing mode and resonant magnetic perturbation (RMP) in a tokamak approximated by a screw pinch configuration. The model is applied to the analysis and understanding of the mechanism underlying the tearing mode suppression induced by resonant magnetic perturbation as observed in recent tokamak experiments and simulations [1,2]. Numerical solutions of the model demonstrate that at lower strength, RMPs are able to reduce the tearing mode amplitude. As the RMP strength increases, the tearing mode is locked in phase and its amplitude jumps to a higher level. Model analysis further reveals that both the tearing mode suppression and the mode locking are achieved through the modulation of the tearing mode rotational frequency using RMPs. The model predictions for the parameter regimes of tearing mode suppression and locking have been examined, and comparisons with recent experimental observations and simulations will be discussed.

[1] B. Rao *et al.* Phys. Lett. A 377, 315 (2013).
[2] Q. Hu *et al.* Phys. Plasmas 20, 092502 (2013).

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