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Plasma Rotation Effects on the Externally Driven Magnetic Island Formation[1] YASUTOMO ISHII, Japan Atomic Energy Agency, ANDREI SMOLYAKOV, University of Saskatchewan — We investigate the effects of the current sheet caused by the Alfven resonance on the magnetic island formation by the externally applied perturbation in rotating plasmas. One of the important problems of the driven magnetic island formation is the onset of the rapid island growth after the flow-suppressed growth phase. This onset is triggered by the plasma rotation reduction around the resonant magnetic surface. In the standard theory on this problem, the plasma rotation is damped by the plasma current formed at the resonant surface. In the low viscosity regime, however, the current sheet is formed not at the resonant surface (neutral line) but around the Alfven resonant surfaces. Hence, the plasma rotation is damped in the wider region than that of the magnetic island width. In this case, the critical value shows weak dependence on the viscosity. We revisit the driven magnetic island formation problem by including the Alfven resonance effects in the wide parameter regime.

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