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Destabilization mechanism of edge-localized MHD modes by a toroidal rotation in tokamaks NOBUYUKI AIBA, Japan Atomic Energy Agency, MASARU FURUKAWA, University of Tokyo, MAKOTO HIROTA, SHINJI TOKUDA, Japan Atomic Energy Agency — In JT-60U, some experimental results showed that the ELM frequency depends on the toroidal rotation, and the rapid rotation in the counter direction of the plasma current changes from Type-I ELM to Grassy ELM, whose frequency is high and the amplitude is small [1]. Since both Type-I and Grassy ELMs are considered as ideal MHD modes destabilizing near the plasma surface, theoretical and numerical analyses about the toroidal rotation effects on the edge localized MHD mode are important to understand this dependence of the ELM frequency on the toroidal rotation frequency. Our previous works have illustrated that the toroidal rotation with shear can destabilize low/intermediate-n (¡50) modes [2], but the mechanism of this destabilization is not still clarified. In this paper, we investigate numerically the destabilizing effect of a toroidal rotation on the edge localized MHD mode with the MINERVA code [2], which solves the Frieman-Rotenberg equation. Particularly, we pay attention to the destabilizing effects of the toroidal rotation shear and the centrifuged force on not only equilibrium but also change of equation of motion. [1] N. Oyama et al., Plasma Phys. Control. Fusion 49, 249 (2007). [2] N. Aiba et al., Nucl. Fusion 49, 065015 (2009).

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