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Damping Rate of $n = 1$ EAEs as a Function of Plasma Elongation[1]

C.J. BOSWELL, J.A. SNIPES, MIT-PSFC, A. FASOLI, D. TESTA, CRPP-EPFL, JET EFDA CONTRIBUTORS — Fast particles can resonate with Alfvén eigenmodes (AEs) and drive them unstable up to amplitudes at which they cause rapid radial transport of the fast particles. Knowing the mechanisms that damp the AEs may allow the ability to control the impact they have on the radial transport of the fast particles. Detailed studies of the damping rate of the $n = 1$ toroidally-induced Alfvén eigenmodes (TAEs) on JET have shown that in limiter discharges as the elongation and triangularity of the plasma shape is increased the damping rate of the TAEs also increases. New studies, presented here, of the damping rate of the $n = 1$ elliptically-induced Alfvén eigenmodes (EAEs) localized at the edge of the plasma, show that as the plasma elongation, κ, increases the damping rate decreases to $\gamma/\omega = 0.7\%$ at $\kappa = 1.55$, less than 1/4 the TAE damping rate at the same elongation. This may be due to the widening of the EAE gap as elongation increases and therefore less interaction with the shear Alfvén continuum, an effect that does not occur for the TAE gap. This difference in behavior between the $n = 1$ TAEs and the $n = 1$ EAEs may help in the understanding of the processes that lead to the total damping rate of AEs in general.

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