

Seeding of tearing modes by internal crash events in ASDEX Upgrade and DIII-D tokamaks

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Tearing mode formation after internal crash events like sawteeth or fishbones is one of the most important MHD processes that result in a big island structure and associated confinement degradation in tokamaks. This type of tearing mode formation is considered to be the most important for future fusion reactors like ITER, because large internal events provide strong magnetic perturbations and are thus able to trigger the mode already at very small normalized pressure values. The process implies magnetic reconnection at the rational surface, which has been investigated in great detail in the ASDEX Upgrade and DIII-D tokamaks. In this paper we show that such an internal crash event leads to an ideal kink mode which transforms into a tearing mode on a much longer timescale than the crash itself. Thus, the common belief of fast formation of a big island during the crash has to be revised.

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