

Parametric Dependence of Sawtooth Crash Time in EAST Tokamak

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One of the recurring problems in sawtooth oscillation is the nature of sawtooth crash. Yet, there's no research explaining the variability of sawtooth crash time: Sawtooth crash time changes with different plasma scenarios; even during the current flat top phase in a single discharge, sawtooth crash time is not constant. To explain this variability, the parameters who contribute to this variability are waiting to be found out; also, the dependence of sawtooth crash time on these parameters needs to be analysed. The electron cyclotron emission imaging (ECEI) system armed on experimental advanced superconducting tokamak (EAST) has 384 channels by 24 (vertical) \times 16 (horizontal); with so many channels it can cover a two-dimensional observation area containing almost entirely of the region inside the $q=1$ surface of EAST. Taking the advantage of this large observation area, a method to estimate sawtooth collapse time statistically is introduced. Utilizing this method, based on a large data set, the effects of various plasma parameters on sawtooth crash time are investigated. Through analysis, the negative dependence of sawtooth crash time on heat flux ran out of $q=1$ surface has been observed in more than one discharge. The dependence of sawtooth crash time on Lundquist number and other plasma parameters is still under investigation.