

Recent sawtooth studies on the Tokamak configuration variable

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Recent Sawtooth Studies on the Tokamak a Configuration Variable¹ DUCCIO TESTA, CRPP, GUSTAVO CANAL, STEFANO CODA, BASIL DUVAL, LUCIA FEDERSPIEL, FEDERICO FELICI, SILVANO GNESIN, TIMOTHY GOODMAN, JONATHAN GRAVES, FEDERICO HALPERN, MIHO JANVIER, JOSEF KAMLEITNER, ALEXANDER KARPUSHOV, DOOHYUN KIM, KYUNGJIN KIM, ANTOINE POCHELON, HOLGER REIMERDES, OLIVIER SAUTER, TCV TEAM — We report recent studies performed on the Tokamak a Configuration Variable on the sawtooth instability and its relation with Tearing Modes (TMs). The primary long-term aim of this work is to provide understanding of the relation between sawteeth and TMs so that reliable real-time schemes can be devised for combined sawtooth and TM control in burning plasma experiments such as ITER. Hence, our work has focused on studying: dynamical relation between sawtooth crash and subsequent onset of TMs, sometimes leading to disruptions, as a function of the plasma shape and current profile; coupling of the low m/n modes generated at the sawtooth crash; dynamical evolution of the toroidal rotation during sawteeth; real-time control techniques for the sawtooth period using localized electron cyclotron heating and current drive; distribution function of high energy electrons generated at the sawtooth crash.

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Stefano Coda
CRPP

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