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Ion-Acoustic Turbulence in ECCD-driven TCV plasmas

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Strong X2 electron-cyclotron current drive in the Tokamak à Configuration Variable (TCV) is typically accompanied by rapid (non-collisional) and strong bulk ion heating. Neutral Particle Analyzer (NPA) measurements of the ion properties transverse to the toroidal magnetic field indicate suprathermal ion populations comprising more than 20 % of the ions with temperatures up to several keV [1]. Whereas the RF power is deposited in the very plasma center, fast ions are found almost throughout the plasma column.
Theoretical calculations of the EC driven current are combined with experimental estimations of the relativistic electron drift velocities using oblique ECE measurements in order to assess the conditions to trigger ion-acoustic turbulence, which is believed to be responsible for the ion heating [2]. An attempt of numerically modeling the experimentally observed level of turbulence saturation in the frame of quasi-linear theory will be presented.

[1] A. N. Karpushov et al., 33rd EPS Conference on Plasma Phys. Rome (2006)
[2] Ch. Schlatter et al., 33rd EPS Conference on Plasma Phys. Rome (2006)

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