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Nonlinear Collisional Absorption of High-Harmonic Relativistic Electron Bernstein Modes in the Princeton Spherical Tokamak Plasma.[1]
V. STEFAN, Stefan University — It is shown that an efficient control of anomalous absorption in the Princeton Spherical Tokamak is possible, leading to a favorable convective R-EB harmonics excitation. In this model the driver pump in the electron cyclotron range of frequencies, O- or X-mode, excites relativistic Electron Bernstein Mode[2] harmonics (R-EB harmonics) in the edge region of ST plasma. Nonlinear relativistic EB harmonics, in turn, propagate toward the central region of the ST, whereby they are effectively absorbed in the electron cyclotron resonance region via nonlinear collisional damping. The scaling laws for the thermonuclear yield, ratio of the thermonuclear power to the external power, for the case of excitation of EB harmonics, n(EB) + (n-1) (EB), n= 5,6 harmonic number, and for the excitation of n(EB) + (UH), (UH) the upper hybrid mode, are obtained. The plasma-ignition criterion is analyzed in terms of O- and X-Mode power.

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[2]V. Stefan, Anomalous Absorption of High-Harmonic Relativistic Electron Bernstein Modes in Spherical Tokamak Plasmas (Abstract ID: BAPS.2007.APR.S1.23; The American Physical Society, April-2007 Meeting, April 14-17, 2007, Jacksonville, Florida.

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