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Numerical Linear Device: Numerical simulation of turbulent plasmas in linear devices[1] NAOHIRO KASUYA, NIFS, MASATOSHI YAGI, KIMITAKA ITOH, MASAFUMI AZUMI, SANAE ITOH — Structural formation mechanisms in magnetically confined plasmas are crucial issues in plasma physics. We have been developing a 3-dimensional numerical simulation code called Numerical Linear Device (NLD), which models a simple cylindrical plasma configuration. The 3-field (density, potential and parallel velocity of electrons) reduced fluid model is adopted. Using this code, quantitative comparison of turbulence characteristics with experimental results, such as identification of the observed instabilities, nonlinear saturation level of turbulence, wavenumber spectra and balance of momentum transport are analyzed. For describing the competition between drift and interchange modes, gravitation terms due to the magnetic curvature are added. Parameter scan predicts the experimental condition for excitation of turbulence. It is found that ion-neutral collision is an important parameter to excite drift wave turbulence, and ion viscosity weakly stabilizes the turbulence. Nonlinear simulation gives saturated turbulence. Turbulence characteristics of linear devices LMD and ECH in Kyushu Univ. and CSDX in UCSD will be discussed.

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