Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

3D nonlinear numerical simulation of the current-convective instability in detached diverter plasma.[1] ALEXANDER STEPANENKO, Moscow Engineering Physics Institute, SERGEI KRASHENINNIKOV, Univ of California - San Diego — One of the possible mechanisms responsible for strong radiation fluctuations observed in the recent experiments with detached plasmas at ASDEX Upgrade [Potzel et al., Nuclear Fusion, 2014] can be related to the onset of the current-convective instability (CCI) driven by strong asymmetry of detachment in the inner and outer tokamak divertors [Krasheninnikov and Smolyakov, PoP, 2016]. In this study we present the first results of 3D nonlinear numerical simulations of the CCI in divertor plasma for the conditions relevant to the AUG experiment. The general physical model used to simulate the CCI, qualitative estimates for the instability characteristic growth rate and transverse wavelengths derived for plasma, which is spatially inhomogeneous both across and along the magnetic field lines, are presented. The simulation results, demonstrating nonlinear dynamics of the CCI, provide the frequency spectra of turbulent divertor plasma fluctuations showing good agreement with the available experimental data.

[1]This material is based upon the work supported by the U.S. Department of Energy under Award No. DE-FG02-04ER54739 at UCSD and by the Russian Ministry of Education and Science Grant No. 14.Y26.31.0008 at MEPhI.

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Date submitted: 11 Jul 2017 Electronic form version 1.4