Recent observations on AUG tokamak [1] revealed fluctuations of radiation loss in the vicinity of X-point in the regime where inner divertor was detached while the outer one was still attached. These fluctuations disappear when outer divertor detaches. In Ref. 2 it was suggested that one of the plausible explanations of such fluctuations can be related to the onset of current-convective instability (CCI). Indeed, the electron temperature difference between inner (cold) and outer (hot) divertors results in electric current flowing through the SOL and divertor plasmas between inner and outer divertor targets [3]. Usually in hot fusion plasma the CCI is stabilized by large electron heat conduction along the magnetic field. However, electron heat conduction in cold inner divertor becomes small and cannot stabilize the CCI anymore. The growth rate found in [2] shows that characteristic frequency of saturated turbulence driven by the CCI in a ball park agrees with experimental data from [1]. However, more studies are still needed for more detailed comparison with experimental data.

In this contribution we present the results of numerical simulations of the dynamics of the CCI performed with code BOUT++ [4]. The maximum growth rate of the CCI, the characteristic longitudinal and perpendicular wavelengths of the most unstable modes, as well as a strong reduction of the growth rate by magnetic shear found from our simulation confirm analytic estimates from Ref. 2. In addition, we present the results of the simulations of the non-linear stage of the CCI and compare them with available experimental data from Ref. 1.

References