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Plasma equilibrium in the vicinity of X-point S.I. KRASHENINNIKOV, UCSD, T.K. SOBOLEVA, J.J. MARTINELL, UNAM, Mexico — In [1] it was demonstrated that a strong coupling of ExB and parallel flows can result in a large pressure variation along the magnetic flux surfaces. Experiment studies also show [2] a strong inhomogeneity of plasma pressure in the vicinity of X-point. Moreover, similar to the conclusions of Ref. 1, UEDGE modeling of edge plasma in DIII-D tokamak with ExB drift effects [2] back up experimental observations and also highlights an importance of drifts. The effects of parallel and ExB flow coupling can be important for many physical applications including physics of tokamak plasma transport in X-point region. In this paper we extend the results of Ref. 1 to more general equilibrium magnetic configurations. We adopt "cylindrical" tokamak geometry with a strong "toroidal" magnetic field in z-direction corresponding to the vicinity of X-point and assume that there is no z-dependence of the plasma parameters. We consider continuity, parallel plasma momentum balance (including ExB drifts), and parallel Ohm's law equations. We find analytically two general classes of plasma equilibrium: one, which has the essential features of inhomogeneity seen in the DIII-D experiments and another one, which can be considered as the extension of the results of Ref. 1 on more general magnetic configuration. [1] S. I. Krasheninnikov, D. J. Sigmar, and P. N. Yushmanov, Phys. Plasmas **2** (1995) 1972 [2] M. J. Schaffer, B. D. Bray, J. A. Boedo, et al., Phys. Plasmas **8** (2001) 2118

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