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Electromagnetic effect on divertor heat-load width in the total-f edge gyrokinetic code XGC[1] SEUNG-HOE KU, ROBERT HAGER, M.D.J. COLE, A. Y. SHARMA, Princeton Plasma Physics Laboratory, A. MISHCHENKO, Max Planck Institute for Plasma Physics, C.S. CHANG, Princeton Plasma Physics Laboratory — Predictive electrostatic simulation of the divertor heat-load width λ_q in the edge gyrokinetic code XGC has been validated against experimental measurement and Eich formula in the three major US tokamaks [1], including a highest field C-Mod result at a later time. The same code, however, predicted, that the full-current (15MA) FPO ITER will have its λ_q that is 6X wider than the most optimistic Eich-formula prediction, while agreeing with the Eich value for the pre-fusion power operation at 5MA. XGC also predicted that the highest current NSTX-U plasma will have λ_q that is about 2X wider than the Eich value. It has been found that the arousal of the weakly-collisional TEM across the magnetic separatrix is responsible for the λ_q enhancement. Here, we report on an ongoing study with XGC of how EM turbulence affects the divertor heat-load width. XGC has two EM schemes installed: explicit [2] and implicit [3]. Present study is based on the explicit scheme that uses the pullback scheme and the control variate method.

[1] C.S. Chang, S. Ku, A. Loarte et al., Nucl. Fusion 57, 116023 (2017)
[2] A. Mishchenko, A. Koenies, R. Kleiber, M. Cole, Phys. Plasmas 21, 092110 (2014)
[3] G. Chen and L. Chacn, Comp. Phys. Com. 197, 73-87 (2015)

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