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Total-f extension of an electromagnetic gyrokinetic algorithm in mixed-variable formulation[1] ROBERT HAGER, SEUNG-HOE KU, M. D. J. COLE, AMIL SHARMA, Princeton Plasma Physics Laboratory, ALEXEY MISHCHENKO, Max-Planck Institut fr Plasmaphysik, C.S. CHANG, Princeton Plasma Physics Laboratory — Numerical studies [e.g. D. Hatch et al., Nuclear Fusion 57, 036020 (2017)] suggest that electromagnetic effects on micro-turbulent transport could be relevant in tokamak edge plasma and impact the height and shape of the H-mode pedestal. For simulation of these phenomena in realistic geometry including the pedestal, scrape-off layer and divertor plates, we extend the delta-f electromagnetic gyrokinetic algorithm in mixed-variable formulation [A. Mishchenko et al., Phys. Plasmas 21, 052113 (2014)] implemented in XGC to a total-f formulation. We discuss the numerical implementation, performance, and scalability of this algorithm as well as results of verification exercises. Results of studies applying this new algorithm are presented separately by S. Ku (for EM effect on divertor heat-load width), and A. Sharma (for high-beta, highly shaped NSTX plasma).

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