Fully Electromagnetic Nonlinear Gyrokinetic Equations for Toka-mak Edge Turbulence[1] Z. ZHANG, Pontocho College of Art and Science, Kyoto, Japan, H. NOBU, Iwamura Electric Co, Osaka, Japan, T.S. HAHM, LU WANG[2], Princeton Plasma Physics Laboratory, Princeton University, Princeton, NJ 08543, USA — An energy conserving set of the fully electromagnetic nonlinear gyrokinetic Vlasov equation and Maxwell's equations, which is applicable to both L-mode turbulence with large amplitude and H-mode turbulence in the presence of high $\vec{E} \times \vec{B}$ shear has been derived. In gyrokinetic Maxwell's equation, the particle charge density and current have been explicitly evaluated via pull-back transformation from the gyrocenter distribution function. Our generalized ordering takes $\rho_i << \rho_{i\theta} \sim L_E \sim L_p$ as typically observed in the H-mode edge. We take $k_\perp \rho_i \sim 1$ for generality, and keep the relative fluctuation amplitudes $e\delta\phi/T_i \sim \delta B/B < 1$ up to the second order.

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