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Gyrokinetic Simulation of HL-2A H-mode Turbulent Transports HUA-SHENG XIE, YONG XIAO, Institute for Fusion Theory and Simulation, Department of Physics, Zhejiang University, 310027 Hangzhou, China — Gyrokinetic simulations using GTC code are carried out to study recent HL-2A H-mode experiments (shots #19298, 14048, 14052). In those experiments, both low frequency (LFT) and high frequency (HFT) turbulences are found. The LFT is found to be mainly electrostatic (E.S.) with poloidal mode number m \sim 14-33 and frequency f $\sim 25-65$ kHz. Meanwhile, the HFT is found to be mainly electromagnetic (E.M.) with poloidal mode number m \sim 16- 38, toroidal mode number n \sim 6-14 and frequency f \sim 100-400 kHz. In the E.S. simulation, a low-frequency unstable mode is found in the electron diamagnetic direction and no unstable mode is found when the electrons are treated adiabatic. Hence, the LFT is identified to be trapped electron mode (TEM). In linear stage, the most unstable mode is found to be $n \sim 20$ and m \sim 50-80. The dominant poloidal mode number will downshift to m \sim 15-40 in the nonlinear stage, which is close to the experimental observation. In the E.M. simulation, strong ideal and high frequency kinetic ballooning modes (KBM) are found. To verify the KBM capability of GTC, detailed benchmarks with analytic equilibriums are also shown.

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