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Gyrokinetic simulation study on ion temperature gradient modes and zonal flows in Large Helical Device experiments[1] MASANORI NUNAMI, TOMO-HIKO WATANABE, HIDEO SUGAMA, KENJI TANAKA, National Institute for Fusion Science — Ion temperature gradient (ITG) modes and zonal flows in the Large Helical Device (LHD) experiments are studied by gyrokinetic simulation. In recent LHD experiments, the high ion temperature of > 4 keV is achieved by injection of neutral beams, and microturbulence spatial profiles were measured. The measured fluctuations most likely propagate to the ion diamagnetic direction in plasma frame and their amplitudes increase with growth of the temperature gradient, of which results show the characteristics of ITG turbulence. In order to investigate the ITG modes and zonal flows in the LHD experiment, we performed gyrokinetic simulation in the corresponding equilibrium field by means of the GKV-X code which incorporates full geometrical effects of non-axisymmetric field configuration. From the calculation, the growth rate of the ITG mode peaks at r=0.65a where the temperature gradient is most away from its critical value. The obtained results show agreements with the measurements in the experiments. It is also found that the zonal flows are slightly enhanced in inner radial region.

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