Investigation of velocity diffusion in the presence of a broad-band Lower Hybrid wave spectrum[1] JUNGPYO LEE, PAUL BONOLI, JOHN WRIGHT, MIT-PSFC, ALCATOR C-MOD TEAM — Lower Hybrid (LH) waves are attractive for driving current in Tokamak because of high efficiency. The quasi-linear diffusion coefficient[2] has been used in the past to estimate the current density by electron landau damping. We numerically evaluate the diffusion coefficient taking into account the broad band spectrum of LH wave. The motion of a single electron is simulated by a one dimensional non-linear momentum equation along the magnetic field, and the value of velocity diffusion averaged over initial positions is computed. The electron is accelerated by an electric field whose wavenumber spectrum is broad and discrete due to toroidal geometry. The broad band spectrum induces phase mixing so that it allows only a limited number of kicks every revolution of the electron. We compare the numerically computed diffusion coefficient with the quasi-linear diffusion coefficient[1] as a function of the magnitude of the electric field with Alcator C-Mod LH wave parameters. We also present diffusion coefficient profiles in velocity space overlapped by many resonance modes.

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