Theory of fine-scale zonal flow generation\textsuperscript{1} LU WANG\textsuperscript{2}, T.S. HAHM, Princeton Plasma Physics Laboratory, Princeton University, Princeton, NJ 08543, USA — Most zonal flow generation theory has been built upon drift wave turbulence with a usual assumption of $q_r \rho_i \theta \ll 1$ [Diamond et al., IAEA-CN-69/TH3/1 (1998), Chen et al., Phys. Plasma 7, 3129 (2000)]. However, recent nonlinear GTC simulations of trapped electron mode (TEM) turbulence exhibit a relatively short radial scale of the zonal flows with $q_r \rho_i \theta \sim 1$ [Z. Lin et al., IAEA-CN/TH/8-4 (2004)]. This work reports an extension of zonal flow growth calculation via the wave kinetics approach to this short wavelength regime. A generalized expression for the neoclassical polarization shielding [Rosenbluth and Hinton, Phys. Rev. Lett. 80, 724 (1998)] comes from the modern bounce-kinetic equation [Fong and Hahm, Phys. Plasmas 6, 188 (1999)].

\textsuperscript{1}This work is supported by U.S. DOE and China Scholarship Council (LW).
\textsuperscript{2}Permanent address: Department of Physics, Peking University, Beijing 100871, China

Lu Wang
Princeton Plasma Physics Laboratory, Princeton University,
Princeton, NJ 08543, USA

Date submitted: 11 Jul 2008