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Extended MHD simulations of Rayleigh-Taylor instability with real frequency in a 2D slab RYOSUKE GOTO, The Graduate University for Advanced Studies (SOKENDAI), HIDEAKI MIURA, ATSUSHI ITO, MASAHIKO SATO, National Institute for Fusion Science, TOMOHARU HATORI, The Graduate University for Advanced Studies (SOKENDAI) — Small scale effects such as the Finite Larmor Radius (FLR) effect and the Hall term can change the linear and non-linear growth of the high wave number unstable modes of the pressure driven instability considerably. Here we consider a simple Rayleigh-Taylor (R-T) instability in a 2D slab, and study the effect of the Hall term and the FLR effect to the R-T instability by means of numerical simulations of the Braginskii-type extended MHD equations [1]. As we have reported earlier, the linear growth rates of the high wave number modes are highly reduced when the Hall term and the FLR effect are added simultaneously [2]. However, there appears little real frequency in the previous work. Since the diamagnetic drift associated with the real frequency is considered to affect the growth of the linear and nonlinear evolutions, we provide a new equilibrium in which appearance of the real frequency is expected and carry out numerical simulations. Influences of the real frequency on the growth rates as well as on the nonlinear mixing width for some combinations of the Hall and the FLR parameters are going to be presented.

[1] S. I. Braginskii, Rev. Plasma Phys., 1, 205 (1965).
[2] R. Goto et al., to appear in the Plasma Fusion Research (2014).

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