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Laboratory study of magnetic reconnection with a guide field and density asymmetry across the current sheet[1] HONGXUAN ZHU, J. YOO, H. JI, J. JARA-ALMONTE, W. FOX, M. YAMADA, PPPL — It has been known that the diamagnetic drift can stabilize the tearing mode, which is used to explain incomplete reconnection during sawtooth oscillations in Tokamaks [1]. Swisdak et al. propose that reconnection with a strong guide field and pressure asymmetry is suppressed when the relative drift speed between ions and electrons along the outflow direction exceeds the upstream Alfvén speed [2]. Swisdak's argument has been supported by space observations [3], but the exact mechanism of suppression has not been conclusively verified. We will conduct experiments in MRX to study suppression of reconnection with a strong guide field and density asymmetry. We will apply a guide field strength of about 2–3 times of the reconnecting field and achieve a density ratio up to 10. By systematically changing the guide field strength, we will investigate how the electron diamagnetic drift can affect profiles of the magnetic/electric field and patterns of the ion/electron flow. Finally, we will study how these modified field profiles and flow patterns contribute to reduction of the reconnection rate. [1] B. Rogers and L. Zakharov, Phys. Plasmas 2, 3420 (1995). [2] M. Swisdak et al., J. Geophys Res. 108, A5 (2003). [3] T. D. Phan et al., Geophys. Res. Lett. 40, 11 (2013).

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