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Effect of ionization on a collisionless magnetized plasma near a wall[1] JÉRÔME GUTERL, NATALIA KRASHENINNIKOVA, VADIM ROYTERSHTEYN, XIANZHU TANG, LANL — Plasma-wall interactions play a key role in controlled thermonuclear fusion experiments. Wall recycling produces a stream of neutrals which are ionized in the plasma. The ionization of slow neutrals near the wall can significantly affect the sheath and pre-sheath of a magnetized plasma. This was considered previously using analytic models [1,2] for a plasma in which the system size is greater than the neutral ionization length but smaller than the Coulomb collision mean free path. The presence of this ionization source can alter electric field near the surface and affect sheath structure as well as background plasma and ionized particle flow to the wall. Here we present results of PIC simulation for such a simplified boundary plasma model with magnetic field normal to the wall. Employing the state-of-the-art VPIC[3] code, we consider 1D magnetized collisionless plasma. The ionization is modeled as a source which produces thermalized electrons and thermal ions. We examine the effects of source parameters, such as shape, intensity and spatial position on the sheath structure and plasma parameters near the wall.

[1] S. Krasheninnikov et al. Contrib. Plasma Phys. 34, 210 (1994). [2] A. Bailey et al. Nucl. Fusion 24, 1439 (1984). [3] K. Bowers, et al., Phys. Plasmas 15, 055703 (2008).

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