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UEDGE modeling of a small-s FRC reactor's asymmetric scrape-off-layer (SOL)[1] NICHOLAS MCGREIVY, Univ of Pennsylvania, AMIR RAJA, Princeton University, EUGENE EVANS, OLIVIER IZACARD, PPPL, TOM ROGNLIEN, LLNL, SAMUEL COHEN, PPPL — The field-reversed configuration (FRC) is being considered for use as a terrestrial power plant and as a direct-fusion-drive rocket engine for future space missions in the solar system. To produce thrust for a rocket or extract energy for electricity production, an asymmetric SOL has been proposed in which coolant/propellant gas is injected into a gas box at one end of the SOL. Plasma formed in the gas box flows along the SOL and its electrons are heated as they pass near the FRC core. The heated plasma is then ejected out a magnetic nozzle at the opposite end. We have used a 2D fluid code, UEDGE, to conduct numerical simulations of this FRC's SOL. We have examined the effects of power input (1-10 MW) and gas flow (10-200 kA-equiv) on the rockets thrust (1-100 N) and specific impulse (*ca.* 1.5e5 s) as well as on the power flow. One important result is that the high plasma flow out of the gas box and the cold plasma within it reduce the power flow into the gas box well below 50% of the input power. Plasma dynamics of the gas box region have been investigated to assess the degree of detachment that can be obtained for given performance requirements.

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