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Measurements of current-free double layers in two expanding helicon plasma sources XUAN SUN, EARL SCIME, West Virginia University, SAMUEL COHEN, MAHMOOD MIAH, Princeton Plasma Physics Laboratory — This work concerns measurements of parallel ion flow in expanding plasmas generated by two different helicon plasma sources. The measurements indicate the existence of a current-free double layer in a region of diverging magnetic field. With laser-induced fluorescence (LIF), the double layer structure in both helicon plasma sources was investigated through measurements of the bulk parallel ion flow speed. Both double layers have a total potential drop of 3-4kT_e. A stronger double layer, with a potential drop of $\sim 6kT_e$, was created in a uniform magnetic field region with a plasma limiting aperture plate.

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