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Double layers in electronegative plasmas ALBERT MEIGE, N. PLIHON, P. CHABERT, G.J.M. HAGELAAR, J.-P. BOEUF, Ecole Polytechnique, R.W. BOSWELL, Australia National University, M.A. LIEBERMAN, A. LICHTENBERG, University of California-Berkeley — Current-free double layers observed in Helicon sources have attracted much interest, both due to their potential applications in space propulsion for example and because of their fundamental properties. In the case of electropositive plasmas, double layers that have been reported are always static and their amplitude is a decreasing function of pressure (within their range of existence), while in the case of electronegative plasmas, they have also been observed to propagate and their amplitude is essentially independent of pressure. In the present paper, focus is put on the static and propagating double layers that have been observed in a Helicon-type reactor filled up with a low-pressure mixture of Ar/SF₆: the most significant experimental results are reviewed, an analytical model describing the static double layer is presented and a fully self-consistent hybrid simulation is developed to shed light on the propagating double layer. From this, a formation mechanism is proposed.

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