

Abstract Submitted
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Theory and particle-in-cell simulation of ion-ion plasmas GARY LERAY, ALBERT MEIGE, JEAN-LUC RAIMBAULT, PASCAL CHABERT — Ion-ion plasmas have many potential applications such as in material processing (to minimize charging in the fabrication of microelectronic devices), in negative ion sources etc. In all these applications, the design of extracting grids implies a good knowledge of the sheath and the presheath in such plasmas. A full particle-in-cell simulation and a kinetic theory are developed to investigate ion-ion plasmas under the influence of a DC bias voltage. It is shown that high-voltage sheaths following the classical Child-law sheaths form within a few μs after the DC voltage is applied. It is also shown that there exists the equivalent of a Bohm criterion with the corresponding presheath accelerating ions collected at one of the electrodes to the sound speed before entering the sheath.

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