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Exact solution for the generalized Bohm criterion in a two-ion species plasma[1] DONGSOO LEE, University of Wisconsin-Madison, LUTFI OKSUZ, Suleyman Demirel University, Turkey, NOAH HERSHKOWITZ, University of Wisconsin-Madison — For a weakly collisional two-ion species plasma, it is shown that the minimum phase velocity of ion acoustic waves (IAWs) at the sheath/presheath boundary is equal to twice the phase velocity in the bulk plasma. This condition provides a theoretical basis for the experimental results that each ion species leaves the plasma with a drift velocity equal to the IAW phase velocity in the bulk plasma [1]. It is shown that this result is a consequence of the generalized Bohm criterion and IAW dispersion relation. It is now apparent that the results for weakly collisional two-ion species plasmas are the same as for single-ion species plasmas. In both situations, the ion drift velocity at the sheath/presheath boundary is equal to the bulk ion sound velocity.

[1] D. Lee, G. Severn, and N. Hershkowitz, Appl. Phys. Lett. (accepted for publication).

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