

Abstract Submitted
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Negative Drag Coefficient in Electrostatic Pendulum¹ JOSE HERNANDEZ, KARL STEPHAN, Texas State University — This paper focuses on the force produced by corona, the electrohydrodynamic (EHD) effect (“ion wind”). In recent years, the EHD effect has been investigated for purposes of aerodynamic drag reduction. We present a simple experiment involving an electrostatic pendulum that demonstrates “negative drag”. When a thin suspension wire of a ball-bearing pendulum is raised to a high enough DC potential to produce corona, positive feedback is established between the ion wind produced by the corona and the direction of air currents around the wire. This positive feedback produces an effective negative drag that adds mechanical energy to the system and causes the pendulum amplitude to increase approximately exponentially over a period as long as four minutes. In this paper we quantify the net negative drag on the system and propose a qualitative theory as to why negative drag is produced.

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