

Abstract Submitted
for the OSF17 Meeting of
The American Physical Society

Testing Drag Models with a Pendulum Oscillator HUNTER DAY-MON, ERNEST BEHRINGER, Eastern Michigan University — We designed and built a simple pendulum to test drag models for two 3D-printed pendulum bobs: a spherical bob, and a cylindrical bob with spherical endcaps. The mass of each bob could be controllably varied. We recorded and analyzed video of the motion of each bob while it oscillated from 30 to 20 degrees relative to the vertical. For each bob, we used two different string lengths, and for each string length, we used at least 13 different masses. We created a Python program that simulates the motion of the spherical pendulum bob and allows for comparisons between theoretical predictions and experimental data. We found the drag to be 1.5 times that for a smooth sphere. We also recorded high-speed Schlieren video to visualize how each of the bobs interacted with the surrounding air and thereby observed the entrainment of the air behind the pendulum bobs.

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Date submitted: 15 Sep 2017

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