

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

The aerodynamics of jumping rope JEFFREY ARISTOFF, HOWARD STONE, Department of Mechanical and Aerospace Engineering, Princeton University — We present the results of a combined theoretical and experimental investigation of the motion of a rotating string that is held at both ends (i.e. a jump rope). In particular, we determine how the surrounding fluid affects the shape of the string at high Reynolds numbers: the string bends toward the axis of rotation, thereby reducing its total drag. We derive a pair of coupled non-linear differential equations that describe the shape, the numerical solution of which compares well with asymptotic approximations and experiments. Implications for successful skipping will be discussed.

Jeffrey Aristoff
Dept of Mechanical and Aerospace Engineering, Princeton University

Date submitted: 15 Nov 2010

Electronic form version 1.4