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Chaotic dynamics of a candle oscillator MARY ELIZABETH LEE, Georgia Inst of Tech, GREG BYRNE, FDA, FLAVIO FENTON, Georgia Inst of Tech — The candle oscillator is a simple, fun experiment dating to the late nineteenth century. It consists of a candle with a rod that is transverse to its long axis, around which it is allowed to pivot. When both ends of the candle are lit, an oscillatory motion will initiate due to different mass loss as a function of the flame angle. Stable oscillations can develop due to damping when the system has friction between the rod and the base where the rod rests. However, when friction is minimized, it is possible for chaos to develop. In this talk we will show periodic orbits found in the system as well as calculated, maximal Lyapunov exponents. We show that the system can be described by three ordinary differential equations (one each for angle, angular velocity and mass loss) that can reproduce the experimental data and the transition from stable oscillations to chaotic dynamics as a function of damping.

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