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Closing the lid: Fluid dynamics of telescopic cardboard boxes¹
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Department of Physics, Tech Univ of Denmark — Cardboard boxes are an important form of packaging for products in the food, electronics, and medical industries. Here, we focus on the fluid dynamics of a basic process: closing the lid of telescopic cardboard boxes. The characteristic slow vertical sliding motion of the lid is controlled by viscous flow in a thin film of air in the gap separating the lid and the base of the box. If the lid and base fit tightly, it is difficult for the consumer to remove the lid. By contrast, if the lid is loose, it can accidentally open and damage the content. A properly sized lid provides an appropriate tradeoff between safety and convenience. Yet, the time, and hence cost, required to close the lid before shipment or storage may still be significant. We discuss this process and the dependence of the closing dynamics on physical and geometric parameters.

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