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Not quite liquid rope coiling JAMES HANNA, NICHOLAS CORBIN, WESLEY ROYSTON, HARMEET SINGH, RICK WARNER, Virginia Polytechnic Institute and State University — The coiling of liquid and solid ropes onto surfaces has been the complicated subject of several recent studies. Here we discuss the related problem of impact of a discrete ball-and-link chain, an object whose dynamics often mimic those of a continuous one-dimensional fluid or solid. Our interest is in a particular counterintuitive effect, namely that impact onto a surface induces an additional acceleration, such that a chain falling onto a table will descend faster than a chain in free fall. We employ high-speed imaging and particle tracking to examine this process in detail. We resolve an open question, confirming the existence of the effect in a typical ball-and-link chain, and note several other curious effects. In contrast with existing theoretical models of the process for a continuous string or rope, the extra acceleration begins at a finite time (or rather, distance along the chain) after impact onto a flat, non-tilted surface. The extra distance traveled by the impacting chain exhibits a complicated non-monotonic dependence on the tilt orientation of the impact surface. We speculate as to the origins of the effect, and eliminate some possible explanations.

James Hanna
Virginia Polytechnic Institute and State University

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