

Abstract Submitted  
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**Coiling Spaghetti: Deposition of a Thin Rod onto a Moving Substrate** PEDRO REIS, Massachusetts Institute of Technology, JUNGSEOCK JOO, UCLA, JOSEPHINE MANNENT, MIT, JOEL MARTHELOT, ESPCI, Paris, DANNY KAUFMAN, EITAN GRINSPUN, Columbia University — We investigate the oscillatory coiling patterns obtained when a thin elastic rod is deposited onto a moving solid boundary (conveyor belt). Through a combination of well controlled desktop experiments and numerics, we explore the phase diagram of this coiling process and identify the underlying physical ingredients. Our novel numerical method implements a discrete notion of bending and twist based on ideas ported from differential geometry, and exhibits excellent performance and robustness. This enables us to carry out predictive direct simulations of the large deformations of the thin elastic rod interacting with the moving substrate, that are in excellent agreement with our experiments. Applications of this coiling process range from the coiling of nanotubes to the laying down of transoceanic cable and pipelines in the ocean bed.

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