Propagation of elastic waves in a soft strip: effect of a static pre-stretch

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Abstract

Due to their remarkable deformability, soft structures play an essential role in many functionalities of living organisms. Processes such as locomotion, perception, and communication often rely on their particular mechanical properties-for instance, the vibration of vocal cords during speech. In this presentation, I will discuss the experimental investigation of a model system consisting of a simple soft elastomeric strip. I will show how one can capture the full in-plane dynamics using a single camera and highlight the emergence of atypical propagation phenomena, such as conical dispersion. In addition I will examine the effect of the application of an external static pre-stretch on the wave dispersion, thus rationalizing how tension can serve as an external control parameter to tune the propagation; an effect we use one a daily basis as we communicate.

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