

Abstract Submitted  
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**Anomalous bubble propagation in elastic tubes**<sup>1</sup> ANNE JUEL,  
ALEXANDRA HEAP, University of Manchester, UK — Airway reopening is an important physiological event, as exemplified by the first breath of an infant that inflates highly collapsed airways by driving a finger of air through its fluid-filled lungs. Whereas fundamental models of airway reopening predict the steady propagation of only one type of bubble with a characteristic rounded tip, our experiments reveal a surprising selection of novel bubbles with counter-intuitive shapes that reopen strongly collapsed, liquid-filled elastic tubes. We characterize these bubbles in terms of their dimensionless speed and the initial level of tube collapse, and find sub-critical exchanges of stability between them. Moreover, our multiple bubbles are associated with a discontinuous relationship between bubble pressure and speed that sets exciting challenges for modellers.

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