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Folding of Pollen Grains ELENI KATIFORI, Department of Physics, Harvard University, Cambridge MA, SILAS ALBEN, School of Mathematics, Georgia Institute of Technology, Atlanta, GA, ENRIQUE CERDA, Departamento de Fisica, Universidad de Santiago, Chile, DAVID NELSON, Department of Physics, Harvard University, JACQUES DUMAIS, Department of Organismic and Evolutionary Biology, Harvard University — At dehiscence, which occurs when the anther reaches maturity and opens, pollen grains dehydrate and their volume is reduced. The pollen wall deforms to accommodate the volume loss, and the deformation pathway depends on the initial turgid pollen grain geometry and the mechanical properties of the pollen wall. We demonstrate, using both experimental and theoretical approaches, that the design of the apertures (areas on the pollen wall where the stretching and the bending modulus are reduced) is critical for controlling the folding pattern, and ensures the pollen grain viability. An excellent fit to the experiments is obtained using a discretized version of the theory of thin elastic shells.

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