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**Elastic instabilities in a model cerebral cortex** DAVID MAYETT, OKSANA MANYUHINA, J.M. SCHWARZ, Department of Physics, Syracuse University — Soft and biological systems exhibit elastic instabilities, such as buckling, folding and wrinkling, in the presence of external loads, growth, or both. The modeling of such systems calls for a continuum approach to account for the interplay between local elastic stresses and global growth profiles. It is this interplay that can lead to non-trivial geometries. We propose a model of the cerebral cortex, described as an anisotropic multi-layered material with two basic components (white matter and grey matter) undergoing differential growth. We explore the nature of buckling instabilities, assuming a compatibility between the growth and geometric deformation, by solving a nonlinear variational problem with a free interface. We expect that this simplified approach, based on a combination of geometry and elasticity, could give insight into the formation and splitting of folds observed during the development of the cerebral cortex.

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