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Dimple Patterns in Buckling Surfaces DEREK BREID, ALFRED CROSBY, University of Massachusetts — Surface wrinkling has attracted considerable attention in recent years for its ability to generate micro- and nano- scale surface structures via non-lithographic pathways. Although the wrinkle morphology has been considered from an energetic viewpoint for stresses exceeding the critical bifurcation stress, the wrinkle morphology for stress near the critical value is far less understood, in part due to a lack of experimental results in this regime. Recent models for this regime predict the formation of a dimple-phase morphology when the stress is equibiaxial, transitioning to aligned ridges when the stress is anisotropic. Here, we present an experimental investigation into the formation of dimple arrays through the control of the applied stress as well as the geometric parameters of the wrinkling system. We demonstrate the ability to develop dimple arrays over extensive lateral length scales, as well as dimples on the surface of a microscale hemisphere, resulting in a 'golf ball' hierarchical structure. These results shed light on the morphology in the near-critical wrinkle regime and provoke many open questions about the underlying materials mechanics in the development of wrinkle surface structures.

Derek Breid
University of Massachusetts

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