

Abstract Submitted  
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**Flowers in the Fourth Dimension** REBECCA THOMPSON-FLAGG,  
MICHAEL MARDER, University of Texas at Austin — Buckling membranes are seen often in nature from daffodils to torn plastic sheets. These patterns are produced by imposing certain types of metrics on thin sheets. This work looks specifically at patterns formed at the edge of trumpet shaped sheets which are forced to obey an exponentially decreasing metric. Using geometrical techniques a condition for cylindrical symmetry is found. Equations developed by Nash are used to evolve a trumpet from below the limit past the limit. These equations are used to demonstrate that trumpets past this limit cannot fully adopt the metric in three dimensions. A molecular dynamics code is used to create a sheet with points connected by Hookian springs. By changing the equilibrium distance between the springs a target metric can be imposed on the sheet. The energy of the sheet is minimized. The sheet is allowed to move into a fourth spacial dimension and the energy of the sheet in four dimensions, both below and above the symmetry limit, is compared to the minimum energy in three dimensions.

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