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Wrapping a sphere: stress relaxation by wrinkling EVAN HOHLFELD, BENNY DAVIDOVITCH, University of Massachusetts Amherst — The low energy deformations of thin elastic sheets are isometries because these incur no stretching energy while the cost of bending is small. Since there is no isometric map of a flat sheet, i.e. a developable surface, onto the surface of a sphere, it is natural to suspect that any such map must cost finite stretching energy. However, I will show that there are an enormous number of almost isometric mappings which approximate a sphere with arbitrary accuracy and with arbitrarily small stretching energy. I will construct an example using multiscale analysis of a radial wrinkle pattern in a thin elastic sheet bent over a sphere. These techniques could be applied to other wrinkling problems and to problems connected to developable surfaces, e.g. textures in smectic liquid crystals.

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