Abstract Submitted
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Thermal Properties of Bimetallic Disks: Theoretical and Experimental Comparison[1] JOE ZUCHEGNO, California Polytechnic State University, MAUREEN SMITH, MATTHEW MOELTER, NATHAN HESTON, California Polytechnic State University, San Luis Obispo, BIMETALLIC DISK RESEARCH COLLABORATION — Thermal expansion and the corresponding internal material stresses and strains in a bimetallic shell can cause a "snap" action in which the concavity of the shell is symmetrically inverted. The 1953 paper, "Stability of a Bimetallic" Disk by W.H. Wittrick provides a mathematical model for examining the behavior of disks initially set to the shape of a spherical cap. In particular, the shape of the shell and both the trip and reset temperatures are presented. The direct use of this model has been fairly limited, but using modern computing capabilities we replicate the model and apply it to disks significantly larger than those typically used in practical application. Comparison with experimentally measured thermal properties are presented and we find good agreement for the temperature behavior of the disk shape, and the trends for the snap and reset temperatures.

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