Abstract Submitted
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The Isothermal Dendritic Growth Experiment Archive[1] MATTHEW KOSS, College of the Holy Cross — The growth of dendrites is governed by the interplay between two simple and familiar processes—the irreversible diffusion of energy, and the reversible work done in the formation of new surface area. To advance our understanding of these processes, NASA sponsored a project that flew on the Space Shuttle Columbia is 1994, 1996, and 1997 to record and analyze benchmark data in an apparent-microgravity "laboratory." In this laboratory, energy transfer by gravity driven convection was essentially eliminated and one could test independently, for the first time, both components of dendritic growth theory. The analysis of this data shows that although the diffusion of energy can be properly accounted for, the results from interfacial physics appear to be in disagreement and alternate models should receive increased attention. Unfortunately, currently and for the foreseeable future, there is no access or financial support to develop and conduct additional experiments of this type. However, the benchmark data of 35mm photonegatives, video, and all supporting instrument data are now available at the IDGE Archive at the College of the Holy Cross. This data may still have considerable relevance to researchers working specifically with dendritic growth, and more generally those working in the synthesis, growth & processing of materials, multiscale computational modeling, pattern formation, and systems far from equilibrium.

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Matthew Koss
College of the Holy Cross

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