

W0350

Extrapolating Crystallization Conditions and Improving Reproducibility in Protein Crystal Growth: Theory, Experiment and Technology. V. Berejnov and R. E. Thorne, Physics Dept., Cornell Univ., Ithaca, NY 14853 USA.

We will discuss two major practical problems in protein crystal nucleation and growth: (1) the irreproducibility of results obtained using nominally the same drop volume and concentrations, and (2) the difficulty of scaling growth conditions identified using high-throughput screens with nanoliter volumes to the microliter volumes required for growing large crystals.

To address the first problem, we have explored drop shape irreproducibility and its effects on crystallization, and have developed new methods to control drop shape. To address the second, we have performed a theoretical analysis of both vapor transport and batch crystallization and determined scaling relations for important crystallization quantities. These relations are tested through experiments.

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