High-Resolution Thermal Expansion Measurements of Single-Crystalline Ice

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The thermal expansion of H_2O Ice (the common form of ice, with the hexagonal Ih crystal structure) has never before been measured with the resolution that is possible today. We recently completed thermal expansion measurements (5 K < *T* < 270 K) of single-crystalline H_2O and D_2O ice using a capacitance-based device. The relative resolution of the measurements is 1 part in one billion, which is at least 10,000 times higher than prior measurements. Growth and orientation of the single crystals and our thermal expansion method will be described. Discussion of the measurement results will center on anisotropy between the *a* and *c* crystallographic directions, a large phase transition near 100 K, and a minimum in the volume near 60 K. The effect of the heavier deuterium nucleus on the features will be discussed.

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Biography:

John Neumeier received his Ph.D. from the University of California, San Diego in 1990 for research in high-temperature superconductivity. He was employed as a postdoc at the University of Munich (1990-1993) and Los Alamos National Laboratory (1993-1996), where he worked on superconductivity and colossal magnetoresistance. From 1996 through 2002 he served as a physics faculty member at Florida Atlantic University, Boca Raton. From 2002 to the present he has been a physics faculty member at Montana State University. His work centers on the growth and measurement of novel condensed matter materials.