

## Transitioning water to an enhanced heat-conducting phase

James D. Brownridge

Department of Physics, Applied Physics, and Astronomy, State University of New York  
at Binghamton, P. O. Box 6000, Binghamton, New York 13902-6000, USA

### Abstract

Water can be transitioned to an enhanced heat-conducting phase by supercooling only the water at the bottom of a container. The temperature gradient across the 4 cm in the center of an 8 cm long column of water with a 397 mW heat source at the top was lowered from 32°C to 0.75°C when the temperature at the bottom of the column was decreased from 1.2 °C to -5.6°C. The effective thermal conductivity of the water was increased from ~0.607 W/mK to ~24 W/mK. This result demonstrates that water has a high effective thermal conducting phase that has not been previously reported.