



# Measuring Thermal Properties of Tissues (20130333, Dr. John Bischof)

**IP Status:** Issued US Patent; **Application #:** 14/533,510

## Thermal Wave Microscopy Device

A thermal wave measurement device has been designed and can be used for applications in cryotherapy and ablation treatments within the body. The thermal property monitoring device discerns phase shifts and temperature changes in real time. It measures thermal conductivity and diffusivity with sub-millimeter spatial accuracy using a gold thermocouple attached to a pliable substrate such as silicone to make accurate measurements and collect data within tissue. These measurements produce necessary information for successful surgeries and treatments. This technology can be incorporated into a flexible polymeric surface or directly onto a cooling surface such as a cryogenic surface for a catheter balloon or a probe in the human body.

## Thermal State Measurement for Cryotherapy and Ablation

Surgeries and procedures that manipulate temperatures in order to create a change in tissue require constant measurement of the thermal energy and phase shifts in the body in order to be successful. Current measurement techniques, however, are best suited for accumulating data on the steady states of liquids and solid. It is difficult to accurately monitor the changing thermal states of the tissues in real time; for instance, it is nearly impossible to accurately measure the thickness of an ice layer growing off of a cooling surface in real time, which may be necessary information during procedures where too much heating or cooling of tissue can cause damage. Safety and accuracy of procedures that use alteration of temperatures to cause phase shifts can be increased with better suited measuring equipment that is currently unavailable.

### **BENEFITS AND FEATURES OF THERMAL WAVE MICROSCOPY DEVICE:**

- Gold thermocouple makes measurements of phase shift with sub-millimeter accuracy
- Improves the ability to assess phase fronts near delicate tissues
- Potential applications for therapeutic freezing or heating of tissues in all areas of the body

**Phase of Development** Prototype Development

### **Researchers**

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