sensor having one or more heat flux sensor output terminals to provide a measured heat flux signal for a location on or near the surface of the object, and a temperature sensor having one or more temperature sensor output terminals to provide a measured temperature signal for a location on or near the surface of the object, wherein the heat flux sensor includes two or more thermocouple junctions connected in series to provide a voltage output that is indicative of a temperature difference across a given thermal resistance

[0004d] In another aspect, the present disclosure refers to a non-invasive sensor adapted to be placed on or near a surface of an object having a volume with a surface and an internal region, where the internal region of the object has internal properties indicated by corresponding internal parameter(s) and an internal temperature distribution, the non-invasive sensor comprising: a first non-invasive, heat flux sensor-temperature sensor pair; a second non-invasive, heat flux sensor-temperature sensor pair; each of the first and second non-invasive, heat flux sensor-temperature sensor pairs including: a heat flux sensor having one or more heat flux sensor output terminals; a temperature sensor having one or more temperature sensor output terminals, wherein the first and second non-invasive, heat flux sensor-temperature sensor pairs are adapted to be placed at different locations on or near the surface of the object and are subject to a differential heat flux environment.

[0005] At least some examples provide a system for non-invasive sensing of an object having a volume with a surface and an internal region. The system comprises a non-invasive sensor including: a heat flux sensor having one or more heat flux sensor output terminals, and a temperature sensor having one or more temperature sensor output terminals. The non-invasive sensor may be placed on or near the surface of the object. The internal region of the object has internal properties indicated by corresponding internal parameters and an internal temperature distribution. Control circuitry, coupled to the one or more heat flux sensor output terminals and the one or more temperature sensor output terminals, is adapted to: receive a measured temperature signal from the

temperature sensor at one or more specified times; receive a measured heat flux signal from the heat flux sensor at the one or more specified times; determine a measure of heat transfer leaving or entering the object at the surface based on the measured heat flux signal at the one or more specified times; determine a value for each of the internal parameters at the one or more specified times; determine an internal temperature distribution of the internal region of the object at the one or more specified times based on the measured temperature signal, the measured heat flux signal, and the values of the internal parameters; and generate information indicating the internal temperature distribution of the internal region of the object at the one or more specified times.

[0006] At least some examples provide a system for non-invasive sensing of an object having a volume with a surface and an internal region. The system includes a non-invasive sensor including: a heat flux sensor having one or more heat flux sensor output terminals, and a temperature sensor having one or more temperature sensor output terminals. The non-invasive sensor is adapted to be placed on or near the surface of the object, and the internal region of the object has internal properties indicated by corresponding internal parameters and an internal temperature distribution. Control