Thermophotovoltaic energy conversion involves converting energy from heat to electricity through the use of photons. Low efficiency rates limit the use of current thermal technology since radiation emitted through thermophotovoltaics contain less energy than visible light. Most existing technology uses an outside mechanical force to maintain or manipulate a gap between the thermophotovoltaic (TPV) cell and the heat source. The Thermophotovoltaic Electricity Generator utilizes electrostatic forces to maintain a self-regulated micro/nanosize gap between the TPV cell and heat source. This self-regulation minimizes the size and increases the efficiency of power generation. Testing indicates this new technology improves capture of heat waste and increases energy absorption by up to thirty times the industry standard.

**Technology Summary**

Thermophotovoltaic energy conversion involves converting energy from heat to electricity through the use of photons. Low efficiency rates limit the use of current thermal technology since radiation emitted through thermophotovoltaics contain less energy than visible light. Most existing technology uses an outside mechanical force to maintain or manipulate a gap between the thermophotovoltaic (TPV) cell and the heat source. The Thermophotovoltaic Electricity Generator utilizes electrostatic forces to maintain a self-regulated micro/nanosize gap between the TPV cell and heat source. This self-regulation minimizes the size and increases the efficiency of power generation. Testing indicates this new technology improves capture of heat waste and increases energy absorption by up to thirty times the industry standard.

**Features and Benefits**

- Facilitates heat transfer from both high and low temperature heat sources.
- Increases energy efficiency and reduces waste heat from energy inefficient products or processes.
- Utilizes a small, compact design to eliminate moving parts.

**Recent Publications**


**Inventor Profile**

Mathieu Francoeur, Ph.D., Associate Professor - Mechanical Engineering

Michael Bernardi, Ph.D., Process Engineer