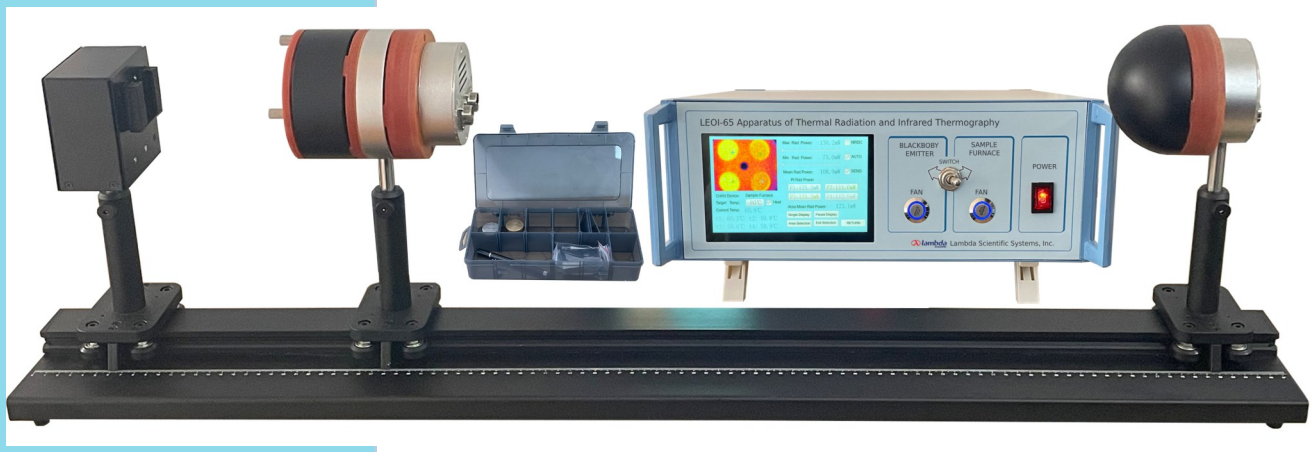
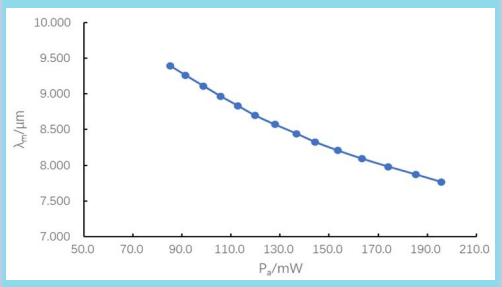
*Construct, Conduct & Comprehend Physics Experiments*

# LEOI-65 Experimental Apparatus of Thermal Radiation and Infrared Thermography




- Helps to intuitively understand the principles of thermal radiation
- Master relevant measurement techniques
- Enhance ability to analyze thermal radiation phenomena
- Highly valuable for physics education




Radiant Power vs. Peak Wavelength (Wien's Displacement Law)

The LEOI-65 Thermal Radiation and Infrared Thermography Experimental Apparatus is designed to explore the principles and phenomena of thermal radiation in depth and to provide strong support for teaching. This experimental apparatus mainly consists of key components such as a blackbody emitter, a sample furnace, and a thermal imager. The blackbody emitter provides a standard source of thermal radiation for precise investigation of radiation laws. The sample furnace is used to hold samples under different temperature conditions for experiments. The thermal imager converts the infrared radiation emitted by objects into visual images, intuitively displaying radiation intensity or temperature distribution.

The instrument supports a wide variety of experiments and covers several important physics topics. On one hand, it allows in-depth study of how the size of the radiating surface and the temperature of the radiating body affect its radiative power, and helps establish the quantitative relationship between radiation intensity and distance. On the other hand, using Wien's displacement law, it enables precise plotting of the relationship between radiated energy and wavelength, visually demonstrating the characteristics of radiation. Additionally, it allows accurate measurement of the emissivity of materials with different surface conditions and comparative analysis of the transmissivity of thermal radiation through various media, thus providing key data for studying the thermal properties of materials.

By operating this experimental apparatus, users can intuitively understand the principles of thermal radiation, master relevant measurement techniques, and enhance their ability to recognize and analyze thermal radiation phenomena. This lays a solid foundation for advanced study of thermodynamics and related research, making the instrument highly valuable for physics education.

## Experimental Examples

1) Study the effect of blackbody temperature on radiative power.
2) Investigate the relationship between radiation intensity and distance.
3) Plot the relationship between radiative energy and wavelength based on Wien's Displacement Law.
4) Measure the transmittance of thermal radiation through different media.
5) Measure emissivity of different samples & analyze relationship between surface condition & emissivity.
6) Observe thermal images of various heat sources and study their emissivity and radiation characteristics.

# Specifications

**A. Blackbody Emitter**
(1) Aluminum alloy body; hemispherical diameter 100 mm; black sandblasted surface
(2) PTC flat plate heater: operating voltage AC 24V
(3) Temperature control with DS18B20 temperature sensor
(4) Equipped with a fan for rapid cooling

**B. Sample Furnace**
(1) Aluminum alloy body; diameter 100 mm; includes 4 sample slots & a removable cover
(2) PTC flat plate heater: operating voltage AC 24V
(3) Five temperature sensors: 1 for temperature control & 4 for real-time sample temperature measurement
(4) Equipped with a fan for rapid cooling

**C. Infrared Thermal Imager**
80 × 62 pixel infrared array, Target temperature range: 0~200°C, Field of view (FOV): 45°

**D. Transmittance Samples**
3 types of samples with window diameter 12 mm; Materials: K9 glass, monocrystalline silicon, and calcium fluoride

**E. Emissivity Samples**
6 types of samples with diameter of 30 mm & thickness of 15 mm; Includes 4 aluminum alloy samples with different surface colors & roughnesses, 1 brass sample, & 1 stainless steel sample

**F. Guide Rail**
Length: 100 cm; Equipped with a scale of graduation value 1 mm

**G. Sliding Holders**
3 sliding holders with position indicators & locking mechanisms

**H. Main Control Unit**
(1) Capacitive touch screen: resolution 800×480 pixels; effective display area: 108×64.8 mm
(2) PID temperature control: range from ambient temperature to 100°C; setting increment: 1°C
(3) Temperature display from sensors: range -55.0 to 125.0°C; resolution 0.1°C; capable of simultaneously displaying furnace temperature and the actual sample temperatures
(4) Thermal imaging display: image noise reduction; single-frame & continuous display modes; display real-time average radiative power or temperature over the full area or user-defined regions; up to 4 real-time data points for radiative power or temperature
(5) "Thermal Radiation Experiment" mode: radiative power display range 0~500.0 mW; resolution 0.1 mW; switchable between automatic/manual setting modes
(6) "Thermal Imaging Temperature Measurement" mode: temperature display range 0~200.0°C; resolution 0.1°C; switchable between automatic/manual setting modes; emissivity adjustable from 0.01 to 1.00 in 0.01 increments

# Part List

| Description | Qty |
|---|---|
| Electric Control Unit | 1 |
| Guide Rail | 1 |
| Slider | 3 |
| Blackbody Emitter | 1 |
| Sample Furnace (with cover) | 1 |
| Infrared Thermal Imager | 1 |
| Transmittance Sample | 3 |

| Description | Qty |
|---|---|
| Emissivity Sample | 6 |
| Touch Pen | 1 |
| Accessory Box | 1 |
| Multi-core Connection Cable | 5 |
| Power Cord | 1 |
| Instruction Manual CD | 1 |

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**Note: above product information is subject to change without notice.**