



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
LECTURE (Celebrating IYQ 2025)

Thermal Radiation and Planck's Formula

The classical path to the beginning of the quantum era

by

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Date: 2 July 2025 (Wednesday)

Time: 2:00 – 3:30 p.m.

Venue: Rm LG23, Science Centre North Block, CUHK

ALL INTERESTED ARE WELCOME

Abstract

Undergraduate and postgraduate students in physics and in science are invited to join me in this lecture to celebrate the International Year of Quantum Science and Technology (IYQ 2025), as declared by the United Nations. The lecture is about the story behind Planck's thermal radiation formula. It summarizes the works by Kirchhoff, Stefan, Boltzmann, and Wien towards the understanding of thermal (blackbody) radiation that had paved the way for Planck's "happy guessing" of his celebrated formula in October 1900 when more experimental data became available. We will also discuss Planck's derivation of his spectral energy density formula reported in December 1900 that combined classical mechanics of damped driven oscillators, electromagnetic theory, and Boltzmann's statistical theory of the entropy. When Planck made his formula consistent with Wien's general form, he found that the energy of the oscillators (Planck's resonators) in his model of matter could only take on discrete values. This was the beginning of the quantum era. Planck stimulated subsequent attempts at re-deriving his formula by Einstein and Bose. Audience with basic knowledge about mechanics, thermodynamics, and electromagnetism at the beginning undergraduate level will appreciate the story better. Please come and join me celebrate IYQ 2025 the *classical* way.

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