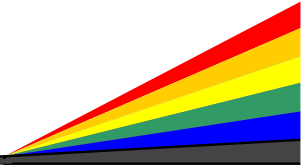


APS COLLOQUIUM SERIES



SPEAKER: Robert D. Y. Tzou,
University of Missouri - Columbia

Robert D. Y. Tzou is Professor and Chairman of the Department of Mechanical and Aerospace Engineering at the University of Missouri-Columbia; He has more than 100 publications in the area of thermal wave propagation and high-rate heat transport and is the author of a book entitled Macro- to Microscale Heat Transfer: the Lagging Behavior. He has worked on many problems relating to energy transport in materials.

TITLE: Ultrafast Transient Modeling in Microscale
Heat/Mass Transport

The manner in which energy is transported in matter or the way in which chemical reactions take place under ultrafast transient conditions requires special treatment and cannot be treated by the usual macroscopic theories. We shall discuss the Dual-Phase-Lag (DPL) model, which allows for very fast micro processes to take place on time-scales, of pico to femtoseconds. The resulting lagging behavior has been shown to capture several experimentally observed phenomena that cannot be described by the macroscopic concepts. Originating from the development made about four years ago, the physical contents of the phase-lag concept have been significantly extended in recent years. The number of perfect correlations to the existing macroscopic and microscopic heat transfer models has now increased to seven; an efficient finite difference scheme has been developed to study the refined structures of thermal lagging in microfilms, and the phase-lag concept has been extended to describe the inter-metallic layer growth in metal matrix composites (MMC). It may be hoped that more challenging experimental results can be identified for further examinations of the phase-lag concept in microscale environments.

DATE: Wednesday, March 1, 2000

TIME: 4:15 p.m.

LOCATION: 402 Auditorium