

SEMINAR

Optical Investigations of Semiconductor Nanowires: New physics, New Heterostructures, and a New Experimental Probe

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11.30am – 12.30pm
Science Lecture Theatre S4, Building 25
16 Rainforest Walk, Monash University

Abstract and Bio

Semiconductor nanowires are prototypical quasi one dimensional materials that range from simple uniform alloys to complex heterostructures incorporating different materials. These nanowire materials can now be grown with high crystalline quality and thus explored for their intrinsic physics. We discuss in particular recent results on cylindrical quantum wells embedded within a nanowire, namely quantum well tubes. We bring to bear a variety of optical techniques to study the strong quantum effects which can be controlled in these structures, with particular attention to exciton localization caused by disorder which has yet to be controlled. We then introduce a new optical technique, transient Rayleigh scattering, that is shown to provide unique insights into the electron-hole dynamics in nanowires. We show that such laser light scattering experiments make it possible to investigate single nanostructures in the mid-IR energy range where standard optical techniques fail.



Howard E. Jackson received the B.S. degree in physics from the University of Rochester, Rochester, NY, in 1965 and the Ph.D. degree from Northwestern University, Evanston, IL, in 1971.

Dr. Jackson is currently Professor of Physics and Distinguished Teaching Professor, at the University of Cincinnati, Cincinnati, Ohio where he has served as both Vice President of Research and as University Dean of the Graduate School. His current research centers on the optical properties of semiconductor nanowires and the roles of active learning in introductory STEM courses. These efforts are currently supported by multiple grants from the National Science Foundation. Before joining the University of Cincinnati, he was associated with McMaster University, and the University of Toronto, Toronto, Canada. He has been a visiting scientist at the Clarendon Laboratory, Oxford University, Oxford, England, and the University of Southampton, Southampton, England.

He has served as the Council of Graduate Schools/National Science Foundation Dean-in-Residence in Washington, DC. Dr. Jackson is a Fellow of the American Physical Society.

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