

RICHARD A. KANT, Ph. D.

Summary: Dr. Kant is a condensed matter and radiation sciences physicist with nearly three decades experience in surface science. He has focused on the use of directed energy techniques (e.g., ion beam and laser treatments) to analyze and to modify the near surface region of matter in the solid state. He has developed numerous experimental facilities, has created several theoretical models that successfully predicted observed surface behavior, and has created computer based solutions to otherwise intractable model equations.

Experience

Undergraduate

- **Lawrence Radiation Laboratory at University of California, Berkeley, 1964.** Performed data analysis for Nobel Laureates Owen Chamberlain and Emilio Segre at UC's Bevatron accelerator.
- **Physics International, Inc., 1966, San Leandro CA.** Computer programmer in a group performing ground motion calculations for enforcement of nuclear test-ban treaty

Post AB

- in Physics from the **University of California at Berkeley (1968)**
- **Physics International, Inc.** San Leandro, CA. Physicist in the Theoretical Physics Group: developed computer code implementing advanced equation-of-state for use in hydrodynamic calculation of ground motion caused by underground explosions. Successfully explained anomalous seismic responses from underground explosions.

Graduate School. –

- **University of New Mexico, 1969.** Albuquerque, NM. Developed instrumentation for and conducted measurements to characterize the evanescent EM wave at a liquid-air interface. Designed and built a nuclear resonance spectrometer for measurement of both nuclear magnetic dipole and nuclear electric quadrupole effects.
- **Sandia Laboratories, 1973,** Albuquerque, NM. Conducted research for Ph. D. thesis on Ion Implantation: Designed and conducted studies using electron microscopy to determine the factors that control the nucleation and growth of secondary phases during ion implantation. Developed theoretical model that explains observed behavior.
- **Ph. D.** in Physics from the **University of New Mexico (1977)**
- **Naval Research Laboratory, Washington DC.** Research Physicist: Research on ion-solid interactions, ion implantation, thin film deposition and etching. Designed methods to modify the tribological and corrosion properties of solids. Expanded Physical-Vapor-Deposition techniques by developing NRLS's Ion Beam Assisted Deposition and Ion Beam Assisted Reactive Ion Etching facilities. Analyzed performance limits Micro-electro-mechanical systems arising from increasing effects of thermo-mechanical noise with decreasing component size. Developed a method to measure thermal conductivity of thin-film diamond. Created new instrument for performing mechanical loss spectroscopy which improved the signal-to-noise ratio by over three order of magnitude. Exploited this instrument to explain observed variations in the time dependence of fatigue behavior and in the frequency stability of high-Q resonators. Developed a new method of chemical sensing based on his new spectrometer. Worked on the development of a laser-based

rapid prototyping method for fabricating electronic circuits using a “Matrix assisted” thin film deposition technique. Directed the design, building, and testing of both sensors and actuators (including miniature antennas) fabricated with Pulsed Laser Deposition. Retired from the Naval Research Laboratory in 2001.

Post Retirement Activities

- **Electrical and Computer Engineering Department of the University of Nevada at Las Vegas.** Consulting with Dr. Robert Schill's group. This includes both assisting Graduate students conduct experimental research and extending the capabilities of a Monte Carlo calculation of secondary electron emission rates.