

T_cSAM/Physics Special Seminar

Texas Center for Superconductivity and Advanced Materials



Prof. Alex Demkov
Department of Physics, University of Texas at Austin

“Computational Materials for CMOS Technology”

Thursday, February 3, 2005

Room 102, University of Houston Science Center

4:00 p.m. – 5:00 p.m.

Abstract

In order to continuously improve the transistor performance the semiconductor industry is exploring a variety of novel structures and materials that only recently were considered only in long-range R&D labs. Such systems include SOI, strained Si on SiGe, and high-k dielectrics for the gate along with pure metal gates instead of poly-Si, low-k dielectrics for ILD etc. Along with these revolutionary technologies, industry pays close attention to squeezing every bit of performance from the existing platforms, strain engineering and effects of shallow trenches is one example. Traditional TCAD tools often lack physical models capable of describing all these new systems, and atomic level modeling is being considered as an important tool in the mainstream semiconductor development. Thus the intrusion of “exotic materials” and significant developments of the atomic scale modeling over the past decade made it possible to derive value from a fairly academic discipline. In this talk I will show how the CMOS roadmap brings about a strange marriage of quantum mechanics and transistor manufacturing.

Bio

Alex Demkov is a condensed matter theorist. He holds a Diploma in Electronic Materials from the Moscow Institute of Steel and Alloys (1986), and a Ph.D. in Physics from Arizona State University (ASU) (1995). After a postdoc in Professor Otto Sankey’s group at ASU he joined Motorola Inc. in 1997 and worked in several R&D organizations in the Semiconductor Products Sector and Corporate Labs in Arizona and Texas. In 2005 Dr. Demkov joined the faculty in the Physics Department at the University of Texas at Austin. From 2002-2004 he served as Associate Editor of the Journal of Vacuum Science and Technology B, In 2004 and 2005 he served as a focused session coordinator for the Forum for Industrial and Applied Physics for the APS March Meeting. Dr. Demkov has authored over sixty publications and holds three U. S. patents. He is active in developing and applying electronic structure methods to materials physics problems, and has worked on semiconductors, transition metal oxides, novel materials, and electron transport in nanosystems.

Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.

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