Physics Colloquium - Colorado State University
4:00 PM, Monday; October 27, 2014; Refreshments at 3:45 PM
120 Engineering (Hammond Auditorium)

Thin-Film Solar Cells: Band Alignment Issues and Opportunities

Jim Sites
Physics Department
Colorado State University

Abstract:

The introduction will include an update on the increasing impact of photovoltaics on commercial-scale electrical generation with an emphasis on thin-film polycrystalline solar-cell materials. The technical portion of the talk will focus on how the performance of thin-film solar cells is affected in significant ways by the band alignment of (a) the two semiconductors forming an n-p heterojunction, (b) the back metallic contact to a p-type semiconductor, and (c) the front transparent-oxide contact to an n-type semiconductor. In each case, examples are chosen from work on CdTe and CIGS solar cells at Colorado State.

Biographical Sketch:

James Sites studies the device physics of low-cost CdTe and CIGS thin-film solar cells. His photovoltaics lab makes precision electrical and optical measurements on solar cells fabricated at Colorado State and by several partners in the U.S. and abroad. The goals are to separate the various solar-cell losses, to explain the losses on a fundamental basis, to make numerical simulations when appropriate, and to suggest strategies for improved solar–cell performance. Prof. Sites has an increasing leadership role in the thin-film solar-cell community, and he is co-author of the chapter on CdTe in the Handbook of Photovoltaic Science and Engineering.