



MMAE SEMINAR

Professor Alan Cocks
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Wednesday, November 1, 2006
3:30 – 4:30 PM
E1-104

Abstract

From Quantum Dots to Turbine Blades

This talk centers on the use of a fundamental thermodynamic variational principle to model kinetic and dissipative processes in engineering materials. It will be demonstrated how the variational principle can be used to provide a framework for the development of: computational models; Rayleigh Ritz procedures; and bounding theorems. These can be used to develop detailed and simplified models of microstructure evolution and damage development. They can also be employed to provide a structure for constitutive laws which describe the inelastic behavior of engineering materials. The utility of the technique will be illustrated through the study of a range of physical processes, including: the growth and evolution of quantum dot structures; and sintering and crack development in thermal barrier coatings.