

ECE Seminar Series

Time and Location: Monday Apr. 1, 2013 at 11am in Engr. E104

Speaker: Prof. R. Mark Bradley, Department of Physics, CSU

Title: Self-Assembled Nanoscale Patterns Formed by Ion Bombardment of Solid Surfaces

Abstract: Bombarding a solid surface with a broad ion beam can produce a remarkable variety of nanoscale patterns. The spontaneous emergence of these patterns is not just fascinating in its own right, since in the future ion bombardment may prove to be an important tool in the fabrication of nanostructures.

As an introduction to the field, the question of why oblique-incidence ion bombardment often produces periodic height modulations or "ripples" on a solid surface will be addressed. I will then move on to discuss a theory we have developed that explains the genesis of the strikingly regular hexagonal arrays of nanodots that can form when a flat surface of a binary compound is subjected to normal-incidence ion bombardment. In our theory, the coupling between the topography and a thin surface layer of altered stoichiometry is the key to the pattern formation. This coupling is also responsible for the pattern formation that occurs when an elemental solid is subjected to ion bombardment with concurrent deposition of a second atomic species.

Bio: R. Mark Bradley received his B.Sc. in physics and mathematics from the University of Toronto in 1979, and his doctorate in theoretical condensed matter physics from Stanford University in 1985. After postdoctoral work at the IBM T.J. Watson Research Center, he joined the faculty of the Department of Physics at Colorado State University in 1987, where he now holds the rank of professor. His current research interests include nanoscale pattern formation induced by ion bombardment and ion-assisted deposition.

Host: Prof. Carmen Menoni (ECE)