

# **CSU PHYSICS COLLOQUIUM**

## **“Nanoscale Self-Organization Induced by Ion Bombardment of Solid Surfaces”**

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Monday November 8th at 4:00pm

120 Engineering (Hammond Auditorium)

### **Abstract**

Bombarding a solid surface with a broad ion beam can produce a remarkable variety of self-assembled nanoscale patterns, including periodic height modulations or “ripples” and hexagonal arrays of nanodots. The emergence of these patterns is not just fascinating --- 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 ion bombardment often produces ripples on a solid surface will be addressed. I will then move on to consider the genesis of more exotic nanostructures: terraced topographies, elongated pyramids, and triangular patches of ripples, all of which are commonly observed in experiments. Finally, a method of rigorously deriving the continuum equation of motion for the surface near the threshold angle for pattern formation will be discussed. This method also gives a method of computing the parameters in the equation of motion using the results of atomistic simulations.

### **Biography**

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 and has a joint appointment in the Department of Mathematics. Bradley is the author of over 110 refereed publications, one of which has been cited over 1,100 times. His research on nanoscale patterns produced by ion bombardment of solids is supported by the National Science Foundation.