## Abstract Submitted for the MAR06 Meeting of The American Physical Society

Atomistic calculations of mass redistribution and surface morphology evolution due to medium energy ion bombardment HARLEY JOHNSON, University of Illinois at Urbana-Champaign, NAGARAJAN KALYANASUNDARAM, University of Illinois at Urbana-Champaign, BENJAMIN DAVIDOVITCH, Harvard University, MICHAEL BRENNER, Harvard University, MIKE AZIZ, Harvard University, JONATHAN FREUND, University of Illinois at Urbana-Champaign — Nanoscale mass redistribution mechanisms and dynamics near a surface due to ion bombardment are studied using molecular dynamics (MD). In addition to sputter erosion, as described by the well-known Bradley-Harper theory, ion assisted surface mass redistribution is identified as an important contributor to surface morphology changes. MD simulations yield a response function based on the change in surface height at any point on the surface due to impact at an arbitrary point on the surface. We derive a linear continuum equation for surface morphology evolution using the new response function and relate the results to pattern formation. We conclude that consideration of both sputtering and mass redistribution could explain the experimentally observed limits on the slopes of ripples formed in this process.

Harley Johnson University of Illinois at Urbana-Champaign

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