Self-organized ordering of nanostructures produced by ion-beam sputtering

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Abstract-

We study the self-organized ordering of nanostructures produced by ion-beam sputtering of targets amorphizing under irradiation. By introducing a model akin to models of pattern formation in aeolian sand dunes, we extend consistently the current continuum theory of erosion by IBS. We obtain new nonlinear effects responsible for the in-plane ordering of the structures, whose strength correlates with the degree of ordering found in experiments. Our results highlight the importance of redeposition and surface viscous flow to this nanopattern formation process.

Index Terms- aeolian sand ripples, surfaces, instabilities, evolution, dynamics, erosion, model

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Citation:

Castro, M.; Cuerno, R.; Vázquez, L.; Gago, R. "Self-organized ordering of nanostructures produced by ion-beam sputtering", Physical Review Letters, vol.94, no.1, pp.016102.1-016102.4, January, 2005.