Seminar

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Institute for Plasma Research

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Title: Effect of Intermittent Low Energy Ion Beam Sputtering on Triangular Structure at Elevated Temperature

Speaker: Dr. Rakhi
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Date: 27th February 2026 (Friday)

Time: 11.00 AM

Venue: Seminar Hall, IPR

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(Conference ID: 5992138016; Password: 232142)

Abstract

Current Research work focuses on low-energy ion beam–induced self-organization on solid surfaces, a powerful bottom-up approach for fabricating ordered nanostructures such as nanoripples, nanodots, and triangular nanostructures [1-5]. When energetic ions impinge obliquely on a solid surface, a complex interplay between sputtering and surface relaxation mechanisms leads to the spontaneous formation of periodic surface morphologies.

Despite the considerable research on pattern formation after low energy ion irradiation in materials such as fusion material (tungsten, graphite), boron nitride (BN), Cu, Si, Ge, SiO2, and GaSb, the fundamental physical mechanisms governing pattern formation remain insufficiently understood. Among the various surface morphologies observed, triangular nanostructures have been comparatively less explored. To address this gap, we have extended our investigation to examine the formation of triangular structures under intermittent ion beam sputtering conditions.

The emergence of triangular patterns is attributed to dispersion effects arising during ion beam bombardment. Earlier, we studied intermittent sputtering at room temperature, where the ion beam is periodically switched ON and OFF at regular intervals. This approach allows additional time for atomic relaxation between irradiation cycles, influencing surface evolution dynamics [6]. However, the role of thermal effects under intermittent ion irradiation has not yet been systematically examined.

In our research work, we investigate the influence of substrate temperature during intermittent sputtering. Our results show that triangular nanostructures persist across all temperatures, with both the number and the surface area of triangular nanostructures increase with temperature. These findings provide deeper insight into the thermally assisted evolution of surface morphologies under non-continuous ion bombardment. Computational simulations to support and further validate these experimental findings are currently in progress.

References:

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