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Hörsaal für Physik

„Temperature dependent rotation of self-organised nanopatterns on ion-irradiated $\text{TiO}_2(110)$ “

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In the presentation I will present the study of the self-organised formation of nanoscale ripples on single crystal anisotropic $\text{TiO}_2(110)$ -(1x1) surfaces irradiated by low energy Ar ion beams. Surprisingly, the orientation of the nanostructures switches by 90° , forth and back, with the systematic change of substrate temperature during irradiation. It will be demonstrated that the formation of the nanostructures is determined by the interplay between the effects of preferential erosion of the monatomic step edges at grazing incidence and directional surface diffusion along the favoured crystallographic orientation. Density functional theory (DFT) calculations reveal that the highly mobile surface species responsible for the development of the nanoripples are TiO dimers.