

THEORY OF BELOW-THRESHOLD KINETIC ELECTRON EMISSION

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Abstract. We investigate the electron emission from crystalline aluminum surfaces due to the impact of rare gas atoms at the surface under grazing angles of incidence. Recent experiments with well prepared Al surfaces made the exploration of the electron emission yield γ in the regime of low projectile velocities feasible. The electron emission process can be primarily attributed to binary collisions, i.e. kinetic energy transfer between the projectiles and target electrons above the surface. Simple models for the target electronic system fail in this regime. We present a calculation of γ in the below – threshold region within the framework of a classical trajectory Monte Carlo simulation in which special emphasis is put on the description of the projectile trajectory and on an accurate determination of the momentum distribution, i.e. the Compton profile of the surface – electronic structure. We employ different methods for calculating the electronic structure and its influence on γ . The momentum distributions can account for kinetic electron emission in the below – threshold region.