

4.3.3. INVESTIGATION OF NANOSCALE PROFILE OF DIELECTRIC SURFACES WITH THE USE OF X-RAY SCATTERING TECHNIQUE

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Nowadays there is an ever growing interest for supersmooth surfaces in modern optics, X-Ray optics, and microelectronics. Among the large number of various approaches to the problem of control of surface parameters, special attention has been paid to the methods based on the analysis of the angular distribution of X-Ray scattering with small angle of incidence (GISAXS). Combined with Atomic-Force Microscopy (AFM) it gives us a comprehensive tool for investigating surfaces and interfacial borders on a nanoscale.

In the present work applications of GISAXS technique for both isotropic and anisotropic surfaces are considered. The description of statistical parameters of a surface is based on Perturbation Theory (PT). It gives the possibility to determine the Power Spectral Density (PSD) function of the surface roughness from the measured scattering diagram directly. PSD-function provides rather complete statistical characterization of a surface profile.

AFM allows us to obtain the profile of a surface. To perform a proper comparison with results of GISAXS technique PSD from AFM data was evaluated. The results of both methods are in good agreement. The peculiarities of proposed approach are considered for both stochastic and anisotropic relief as well.