

## **Use of DWBA and Perturbation Theory in X-Ray Control of the Surface Roughness**

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The formulas for x-ray scattering diagram are deduced and analysed in the first order Distorted Wave Born Approximation (DWBA) without any simplified assumption about an unperturbed wave field nearby a rough interface. The comparison with other approaches described in literature is given. The possibilities of DWBA and the perturbation theory (PT) are discussed as applied to development of x-ray method of the surface roughness control. It is shown that just PT is the most natural and correct theoretical basis of x-ray testing method which permits one, in contrast to DWBA, to extract information from the scattering measurements by unambiguous manner. It is demonstrated that there is the optimum radiation wavelength lying in the soft x-ray and EUV spectral regions which provides a means for an extraction of the maximum amount of information about the surface microtopography from the scattering measurements. Application of existing EUV lasers for the study of the surface roughness is discussed.