

## Symposium M

Symposium Title : OPTICAL AND X-RAY

METROLOGY FOR ADVANCED DEVICE MATERIALS

CHARACTERIZATION

### RECENT ADVANCES IN CHARACTERIZATION OF ULTRA THIN FILMS USING SPECULAR X-RAY REFLECTIVITY TECHNIQUE.

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We present different approaches to analyze the grazing incidence x-ray reflectivity (GIXR) data to characterize ultra thin films. The analysis of the GIXR data yields structural parameters such as surface and interfacial roughness, density profiles and thickness of the film and its individual layers if the film consists of many layers. We shall describe three schemes (1) a model dependent method based on dynamical scattering, which is generally known as recursive formalism, (2) a model independent method based on distorted wave Born approximation and (3) an inversion technique based on Born approximation. We will point out the problem of the non-uniqueness of the solutions, which are generally encountered in analyzing the x-ray reflectivity data based on the recursive formalism when the experimental data is fitted using non-linear least square fitting technique to obtain the fit parameters. We will demonstrate the above formalism on few systems as case studies. We will also show how to converge to a realistic solution using the above mentioned formalisms.