

## **Limits on the application of the Debye-Waller Factor in GISAXS**

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Periodic lamellar gratings are elements which can not only be found in diffractive optics but also as base structures for integrated electronic circuits. As the size of these nanostructures decreases and their complexity increases, new metrology tools are needed to resolve the features in the sub-nm range as well as to account for the imperfections. Grazing incidence X-ray small angle scattering (GISAXS) is well-known and commonly used for the characterization of nanostructures. For the quantification of the line edge roughness of lamellar gratings, a Debye-Waller factor is usually used. Here, we discuss the application limits of this factor with a dedicated set of rough-samples.