Quantities Listed in the Tables

Backscattering Energy, E_B

X-ray energy for which the incident beam is reflected at a Bragg angle of $\Theta_B = 90^o$. These are the lowest energy photons that can be reflected by the analyzer.

$$E_B = \frac{hc}{2d_{hkl}}$$

Integrated Reflectivity, $\int I_R \, d\Theta$

As a measure of the reflection strength the dynamical reflectivity is numerically integrated over the whole rocking curve.

Angular Reflection (Darwin-) Width, W

Intrinsic, dynamical (Darwin-) width associated with a symmetric reflection in a perfect crystal

Change in Energy with Angle, $dE/d\Theta = E_i \cot \Theta$

From the differential Bragg law, this quantity serves as conversion factor from angular width to energy width. It is included for guidance in units of meV/μrad

Intrinsic Energy Resolution, ΔE

Energy resolution of the analyzer reflection due to its intrinsic (Darwin-) width W

$$\Delta E = E_i \cot(\Theta_B) W$$

Geometric Contribution to the Energy Resolution, ΔE_g

Geometric Contribution to the Energy Resolution, based on the analyzer radius **R** and the detector pitch **p** :

$$\Delta E_g = E_i \cot(\Theta_B) \frac{p}{2R}$$

For the present tables, the detector pitch is assumed to be p = 50 μm (Dectris “Mythen” - Detector) while the analyzer radius is R = 2m.

Combined Intrinsic and Geometric Energy Resolution, ΔE_t

$$\Delta E_t = \sqrt{\Delta E^2 + \Delta E_g{}^2}$$

(Note: The total energy resolution of a RIXS setup also contains contributions from the incident energy band pass, beam size at the sample and possible others. These additional contributions are not addressed in the current document)

Symbols

E_i	Incident Photon Energy
Θ_B	Bragg (Incident) Angle
E_B	Backscattering Energy ($\Theta_B = 90^o$)
d_{hkl}	Diffraction Plane Spacing
$\int I_R \, d\Theta$	Integrated Reflectivity, Measure of Reflection Strength
W	Angular (Darwin-) Width of the Reflection
ΔE	Intrinsic Energy Resolution
ΔE_g	Geometric Contribution to the Energy Resolution
ΔE_t	Combined Intrinsic and Geometric Energy Resolution

hc = 12.39841904 keVÅ
1 Å = 0.1 nm = 10^{-10} m = 10^{-7} mm