Multislice Diffraction Theory

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Contents

1 Functions

1.1 lambda_from_eV

This function takes an energy in eV and returns the relativistic electron wavelength. The equation is shown below:

$$\lambda = \sqrt{\frac{h^2c^2}{E^2 - m_0^2c^2}} \tag{1}$$

1.2 rotate_vec_array

Iterates over each vector in the n x 3 array Λ and rotates them around $\hat{x}$, $\hat{y}$, then $\hat{z}$ by tx, ty, and tz (rad) respectively. That is,

$$\left(\forall v \in \Lambda\right)\left(v \to R_z(\theta_z) \cdot R_y(\theta_y) \cdot R_x(\theta_x) \cdot v = \mathcal{R}v\right) \tag{2}$$

rotation_mat Returns a matrix corresponding to a rotation around $\hat{x}$, $\hat{y}$, then $\hat{z}$ by tx, ty, and tz (rad) respectively.[1]

That is,

$$\mathcal{R} = R_z(\theta_z) \cdot R_y(\theta_y) \cdot R_x(\theta_x) \tag{3}$$

rotation_mat_x Returns the rotation matrix around $\hat{x}$ by θ_x, $R_x(\theta_x)$.

rotation_mat_y Returns the rotation matrix around $\hat{y}$ by θ_y, $R_y(\theta_y)$.

rotation_mat_z Returns the rotation matrix around $\hat{z}$ by θ_z, $R_z(\theta_z)$.

[1] See rotation matrices.