NRSF2 Design Document Appendix

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Construct 2 orthogonal q vectors:

$$\begin{aligned}\vec{q_1} &= R_z(-\frac{2\theta}{2})(010) \\ \vec{q_2} &= R_z(-\frac{2\theta}{2})(100)\end{aligned}$$

where

- $2\theta_{peak}$ = position of peak (which is in plane)

In order to convert $\vec{q}$ from instrument coordinate to sample coordinate, the ration will be done on ω, χ and ϕ respectively.

The rotation matrix R_p is defined as

$$R_p = R_x(\phi + 90^o) \times R_y(\chi) \times R_z(-\omega)$$

where

- ω = incident angle
- $\chi = \chi$ rotation about (100) of sample
- $\phi = \phi$ rotation about sample normal

The projection is then

$$\begin{aligned}\alpha &= \cos^{-1}(Q)(001)) \\ \beta &= \cos^{-1}(Q)(100)) \\ \alpha &= \cos^{-1}(Q\prime)(001)) \\ \beta &= \cos^{-1}(Q\prime)(100)) \\ \alpha_p &= \alpha - \alpha\prime \\ \beta_p &= \beta - \beta\prime\end{aligned}$$