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Symmetries in Physics

Seatwork 4

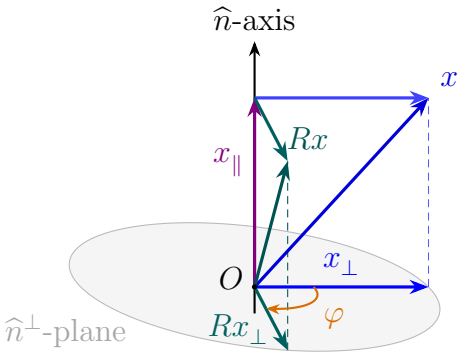
(1) Terms of the day: glide reflection, proper point group

(2) Decompose a vector x into components parallel and perpendicular to $\widehat{n}$, and express $R(\widehat{n}, \varphi)x$ in terms of these components, φ and $\widehat{n}$.

Hint: Recall that

$$R(\widehat{n}, \varphi)x = \cos\varphi x + (1 - \cos\varphi)(\widehat{n} \otimes \widehat{n})x + (\sin\varphi)\,\widehat{n} \wedge x.$$

Note that $((\hat{n} \otimes \hat{n})x)_j = \hat{n}_j(\hat{n} \cdot x)$ (why?).



$$x = x_{\parallel} + x_{\perp}, \qquad Rx = ?$$

*If you need extra paper, please ask the tutor.