$$
\begin{aligned}
\kappa(q) &= \frac{1}{\Omega} \sum_{Q=(\vec{Q},s)} k_B v_{Q_x}^2 \tau_Q \cos^2(qd/2) F(q, \Lambda_{Q_x}) \\
&= \frac{1}{\Omega} k_B v^2 \tau_D \sum_{Q=(\vec{Q},s)} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x}) \\
&= \frac{N}{\Omega} k_B v^2 \tau_D \cdot \frac{1}{N} \sum_{Q=(\vec{Q},s)} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x}) \\
&= \kappa_0 \times \frac{1}{N} \sum_{Q=(\vec{Q},s)} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x}) \\
&= \kappa_0 \times 3 \times \frac{1}{N} \sum_{\vec{Q}} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x})
\end{aligned}
$$

$$
\begin{aligned}
\kappa_0 &= \frac{N}{\Omega} k_B v^2 \tau_D \\
\kappa(q) &= \kappa_0 \times \frac{1}{N} \sum_{Q=(\vec{Q},s)} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x}) \\
\frac{\kappa(q)}{\kappa_0} &= \frac{1}{N} \sum_{Q=(\vec{Q},s)} (\frac{Q_x}{Q})^2 (\frac{Q_D}{Q})^p \cos^2(qd/2) F(q, \Lambda_{Q_x})
\end{aligned}
$$

$Q_D = (6\pi^2(N/V))^{1/3}$ in the case of fcc $Q_D = (3/\pi)^{1/3}\frac{2\pi}{a} = 0.985\frac{2\pi}{a}$
Q_x is the projection of $\vec{Q}$ in (1,1,$\bar{1}$) direction.