

Find the fourier transform of the Yukawa potential $V(r) = \frac{e^2}{r} \exp(-kr)$. We find in spherical coordinates:

$$\begin{aligned}
 \tilde{V}(r) &= \int_0^{2\pi} \int_0^\pi \int_0^\infty \frac{e^2}{r} \exp(-kr) \exp(-i|p|r \cos(\theta)) dr d\theta d\phi \\
 &= -2\pi e^2 \int_0^\infty \int_1^{-1} \exp(-kr) \exp(-i|p|r \cos(\theta)) d \cos(\theta) dr \\
 &= -4\pi e^2 \operatorname{Im} \left(\int_0^\infty \exp(-kr) \exp(-i|p|r) dr \right)
 \end{aligned}$$