

6-7. Suppose the potential energy  $V(\mathbf{r}) = -e\phi(\mathbf{r})$  is the result of a charge distribution  $\rho(\mathbf{r})$  so that

$$\nabla^2 \phi(\mathbf{r}) = -4\pi\rho(\mathbf{r}) \tag{6.48}$$

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In polar coordinates

$$I = \int_0^{2\pi} \int_0^\pi \int_0^\infty \nabla^2 \phi(\mathbf{r}) \exp\left(\frac{ipr \cos \theta}{\hbar}\right) r^2 \sin \theta \, dr \, d\theta \, d\phi$$