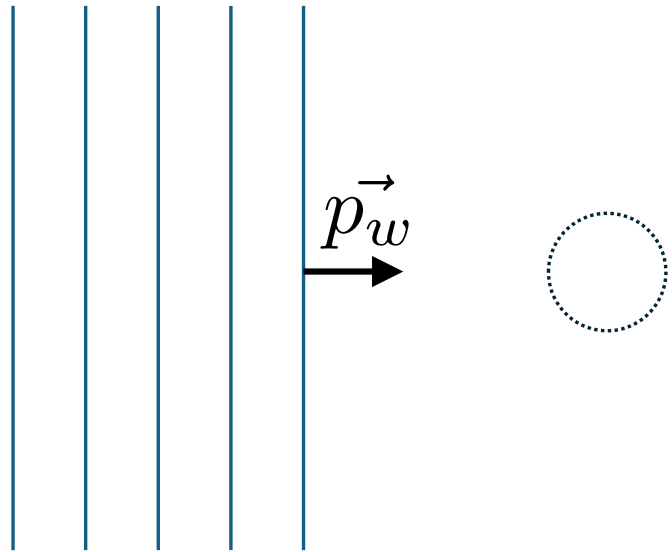
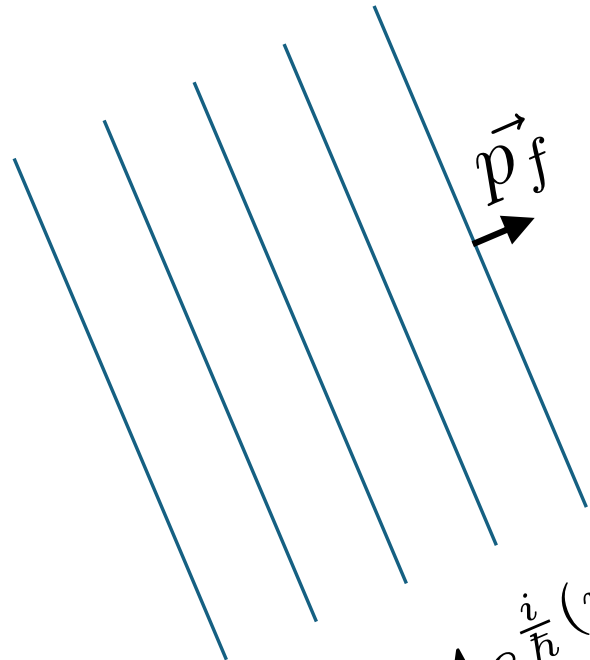
$$\Psi_i(t,\vec{r}) = Ae^{\frac{i}{\hbar}(\vec{p_w}\cdot\vec{r}-E_i t)}$$





$$\Psi_f(t,\vec{r}) = Ae^{\frac{i}{\hbar}(\vec{p_f}\cdot\vec{r}-E_f t)}$$