第四课：算符

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1. 动量算符:$\hat{\vec{p}} = -\mathrm{i}\hbar(\frac{\partial}{\partial \mathrm{x}}\hat{\mathrm{e}}_{\mathrm{x}} + \frac{\partial}{\partial \mathrm{y}}\hat{\mathrm{e}}_{\mathrm{y}} + \frac{\partial}{\partial \mathrm{z}}\hat{\mathrm{e}}_{\mathrm{z}})$;
2. 能量算符:$\widehat{H} = -\frac{\hbar}{2\mu}\nabla^2 + U(x,y,z)$;
3. 角动量算符:$\hat{L} = -i\hbar(\hat{r}\times\nabla)$;
   a. $\hat{L}^2 Y_{lm} = l\times(l+1)\hbar Y_{lm}$
   b. $\widehat{L_z} Y_{lm} = m\hbar Y_{lm}$
4. 厄米算符:$\exists \hat{F} \Rightarrow \int \psi^* \hat{\mathrm{F}} \phi \mathrm{d}\tau = \int \left(\hat{\mathrm{F}}\psi\right)^* \phi \mathrm{d}\tau \text{ or } \hat{\mathrm{F}} = \hat{\mathrm{F}}^+$;