量子信息学
lec 8

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ACM Class,2016
2018 年 7 月 22 日

1 Class 1

1.1 相位因子估计

$$X = HZH$$

$$X|0>=|1>$$

$$X|1>=|0>$$

$$X(\frac{|0>+|1>}{\sqrt{2}}) = 1 * \frac{|0>+|1>}{\sqrt{2}}$$

$$X(\frac{|0>-|1>}{\sqrt{2}}) = (-1) * \frac{|0>-|1>}{\sqrt{2}}$$

在 n 维空间里

$$X|n>=|n+1>$$

$$X^N = I$$

$$\omega_N = exp(\frac{2\pi i}{N})$$

$$\omega_0, \omega_1, ..., \omega_{N-1}$$

$$X = FZF^+$$

$$F|k>=\frac{1}{\sqrt{N}}\sum_{j=0}^{N-1}\omega^{kj}|j>$$

$$F = (\frac{1}{\sqrt{N}}\omega^{kj})_{N*N} \quad \omega = e^{\frac{2\pi i}{N}} \quad N = 2^n$$

$$|\hat{k}>=F|k>=\frac{1}{\sqrt{2^n}}\sum_{j=0}^{2^n-1}\omega^{kj}|j>$$