《量子信息基础》2022.3.1随堂作业：

1. <即教材\*问题1.5> 40分

Consider the wave function

where , *λ*, and are positive real constants.

1. Normalize .

推导思路正确5分

给出正确答案5分

1. Determine the expectation values of and .

⸪ 是奇函数 ⸫

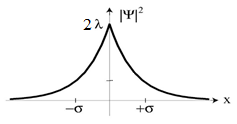
给出正确推导和答案给5分，只给出推导或者答案给3分

给出正确推导和答案给5分，只给出推导或者答案给3分

1. Find the standard deviation of . Sketch the graph of , as a function of , and mark the points and , to illustrate the sense in which represents the “spread” in .

给出正确答案给5分

的图像如下图所示：



给出正确曲线和位置给5分

只给出一项给3分

1. What is the probability that the particle would be found outside this range?

给出推导给5分

给出结果或者给5分

1. <PPT最后一页> 30分

A photon propagates in the direction and passes a linear optical polarizer which is oriented in the direction (see figure below). The state in Figure (a) is while the state in Figure (b) is .

1. Write done the formula of , assuming the light beam is polarized with an angle of *α* to the axis.

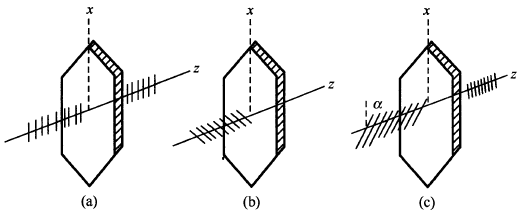
给出正确答案给10分

1. How much is the probability that a single photon could pass the polarizer in (c)?

给出正确答案给10分

1. How does the system maintain the normalization condition?

给出正确答案给10分



1. <即教材\*问题1.15> 40分

Show that

for any two (normalizable) solutions to the Schrödinger equation (with the same ), and .

推导到这步给5分

复共轭函数的薛定谔方程

给出正确的复共轭函数薛定谔方程给5分

推导到这步给5分

推导到这步给5分

推导到这步给5分

给出正确答案5分

\* David J. Griffiths, and Darrell F. Schroeter, Introduction to Quantum Mechanics (3rd Edition), Cambridge University Press (2018).