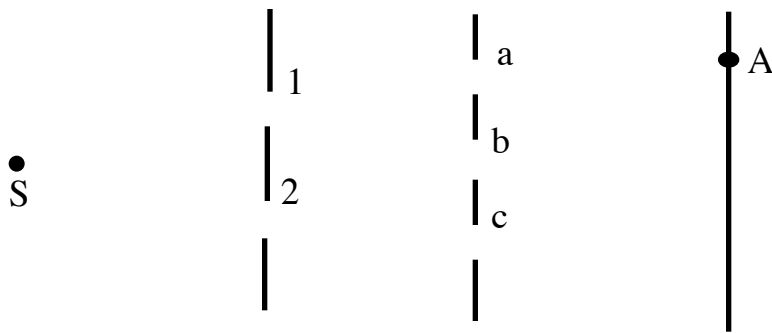


## Problem set 4

Q5 S.2 S.3

Q6 S.10

Consider the following setup:



1) Use the basic rules of quantum mechanics to write the amplitude  $\langle A | S \rangle$  for a particle to be emitted at S and observed at A in terms of the more basic amplitudes  $\langle 1 | S \rangle$ ,  $\langle c | 2 \rangle$ ,  $\langle A | b \rangle$ , etc.

2) Suppose that the basic amplitudes have the values

$$\langle 1 | S \rangle = \langle 2 | S \rangle = 0.1$$

$$\langle a | 1 \rangle = \langle b | 1 \rangle = \langle c | 1 \rangle = 0.1i$$

$$\langle a | 2 \rangle = \langle b | 2 \rangle = \langle c | 2 \rangle = -0.1i$$

$$\langle A | a \rangle = \langle A | b \rangle = \langle A | c \rangle = 0.1 + 0.1i$$

What is the numerical value for  $\langle A | S \rangle$ ?

3) Suppose slit 2 is closed. What is the numerical value for  $\langle A | S \rangle$ ?

4) In the case of 3, when  $10^6$  particles are emitted from S, what is the average number that arrive at A?