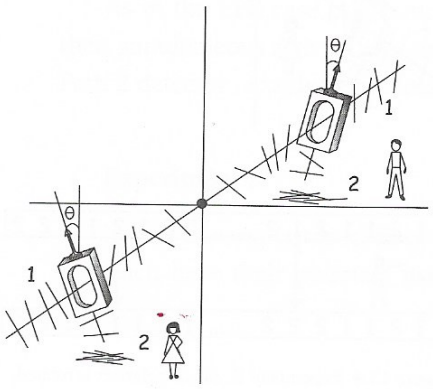
assuming that the number of foton pairs was large enough that statistical error was negligible.

Experiment IV

This time both Alice and Bob each rotate their polarizers by the angle Θ. If they each rotated in the same direction, it would be the same as no rotation at all; their polarizers would still be aligned. So they each rotate their polarizers by Θ in opposite directions.



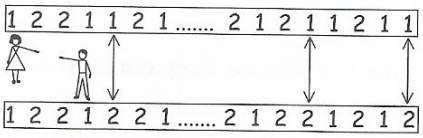


Figure 13.5 Experiment IV: Both Alice's and Bob's polarizers are rotated, and mismatches are due to both rotations

Alice, rotating her polarizer by Θ, changes the behavior of her fotons by the same amount as in Experiment II. She changes what would have happened to 5% of her fotons. The situation is symmetrical. Bob's polarizer rotation by Θ changes the behavior of 5% of his fotons from what would have happened.

Since Alice and Bob each changed the behavior of 5% of their fotons, and since every change could show up as a mismatch when their data streams are compared, we might expect a mismatch rate as high as 10%. There is no way to get a *greater* mismatch rate in a statistically large sample.

We might, however, get a *smaller* mismatch rate. Here's how: It's likely that for some pairs of twin-state fotons, both Alice and Bob *each* caused their twin to change its behavior. The two fotons of such twin-state pairs would thus behave identically. The data for such twin-state pairs would not be recorded as mismatches.

As an example of such a double change of behavior, consider almost vertical twin-state fotons that would have both gone on Path 1 at Alice's and Bob's polarizers had their polarizer axes both remained vertical. If