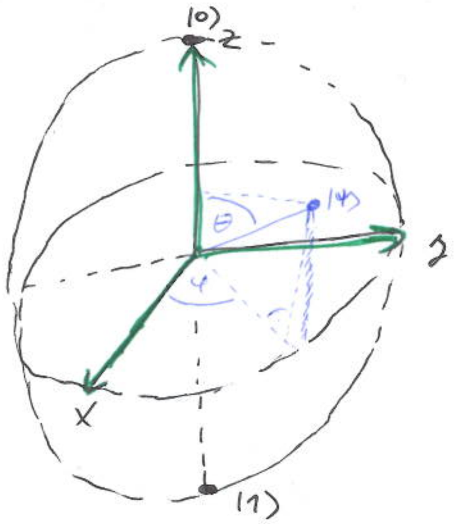
c) combining the information from a) and b) we can more or less reconstruct the state $|\psi\rangle$ but note that our reconstruction still has the flavour of "measurement statistics of $|\psi\rangle$" instead of how does $|\psi\rangle$ look like.

Remember that we had to measure along two orthogonal axis to acquire information about both, the amplitude and the phase.

Recall: in the Bell's inequalities exper. we had to measure along 4 different axis to get all the information we needed



$$|\psi\rangle = \cos\frac{\theta}{2}|0\rangle + e^{i\varphi}\sin\frac{\theta}{2}|1\rangle$$

projection on the $\vec{z}$ axes gives us information about the amplitude

projection on the $\vec{x}$ or $\vec{y}$ axis gives us information about the phase

In general, the measurement of the phase has some dependency on the amplitude

this dependency is trivial in the equally weighted states

$$\frac{1}{\sqrt{2}}\left(|0\rangle + e^{i\varphi}|1\rangle\right)$$

or in the states $|0\rangle$ and $|1\rangle$ where all you have is an irrelevant global phase

2) Quantum crypto BB84

Well, act like Eve in your way :-)