Quanta Study Circles

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Quantum Theory: Session 01

Introduction to Quantum Physics

T.me/QuantaSC

Contents

About Study Circle

About Study Circle

- Purpose
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- Preliminaries
- Mathematical Level
- General Layout
- Interpretations?

The Downfall of Classical Concepts

The Downfall of Classical Concepts

- Positions & momenta as "objective" properties.
- Classical statistical mechanics failures: BBR.
- Planck. Einstein. Photons.
- Heisenberg's uncertainty & wave-particle duality.

- Wave function (is it "objective"?)

The Rise of Randomness

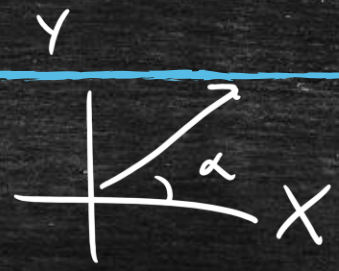
The Rise of Randomness

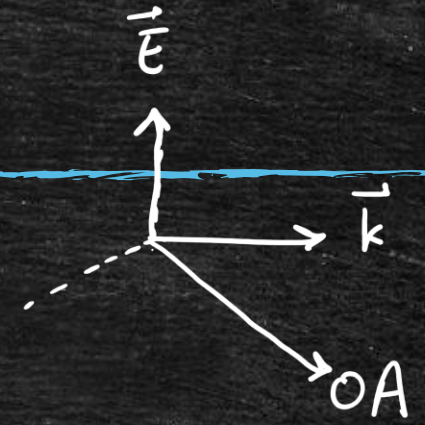
- Heisenberg uncertainty: A little fuzziness?
- Determinism Vs. Photons

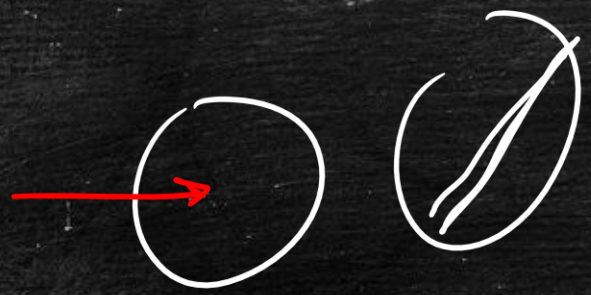
The Rise of Randomness

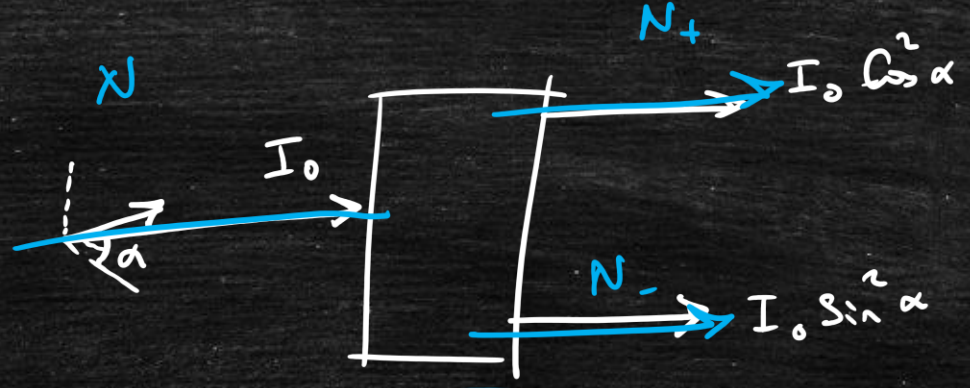
The Rise of Randomness

- Failure of determinism: Photons









$$\vec{E}_x \cos(kz - \omega t) + \dots$$

$$\frac{N_+}{N_+ + N_-} = \cos^2\alpha$$

$$\frac{N_-}{N_- + N_+} = \sin^2\alpha$$

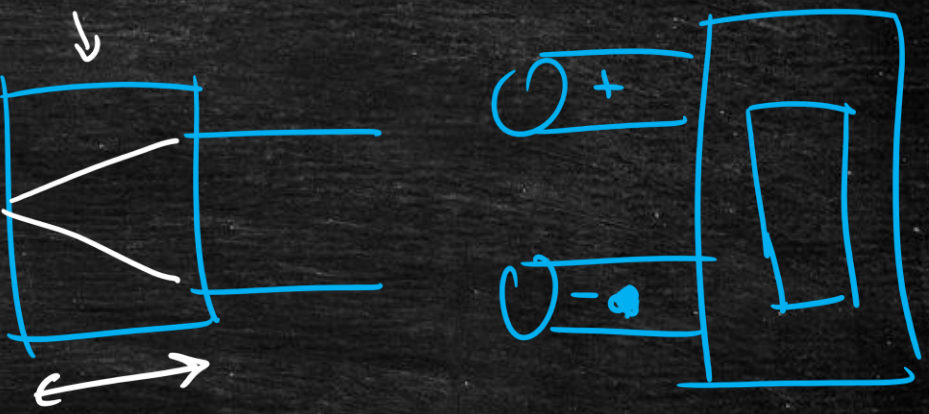
The Rise of Randomness

Polarized Photons

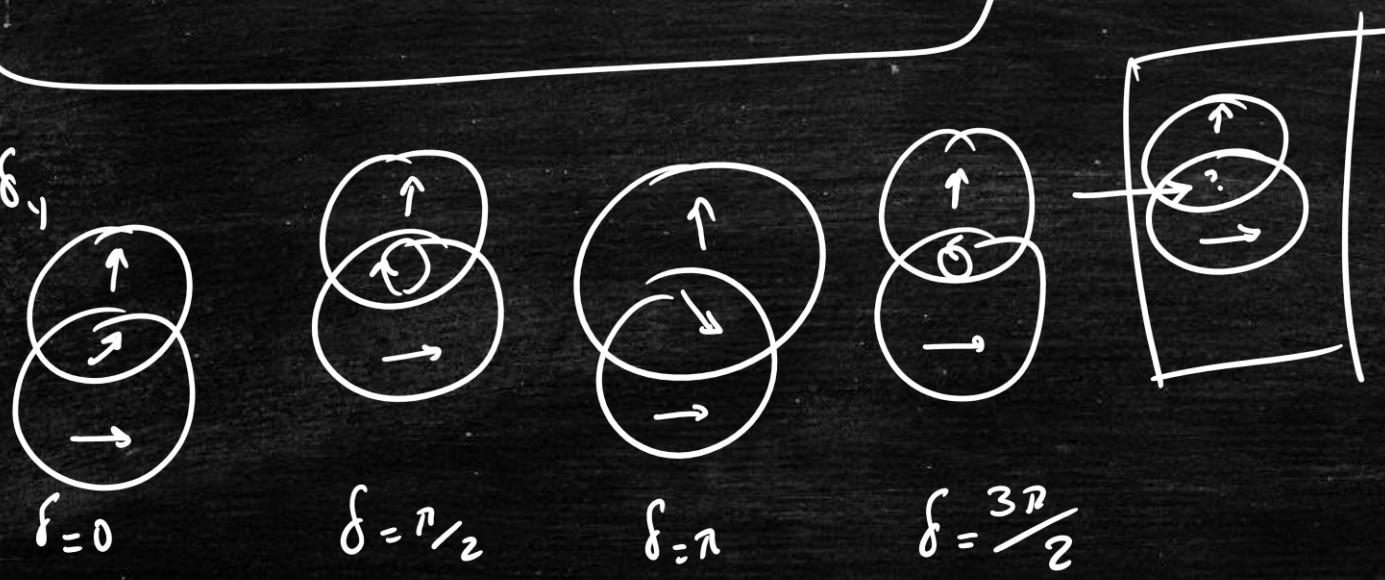
Polarized Photons

- Classical EM Theory

$$\vec{E} = \vec{E}_x \cos(kz - \omega t + \delta_x) + \vec{E}_y \cos(kz - \omega t + \delta_y)$$



$\delta := \delta_x - \delta_y$



Polarized Photons

- Photons at overlapping region.

$\delta = 0$: