11-21-2024
Hi ,

I thought I would start sharing the essential elements of what I am currently reviewing to get up to speed on quantum mechanics or quantum field theory

I am using a textbook
Quantum Physics Problems and Solutions by Zbigniew Ficek because it contained practical quantitative problems.
Found it useful and here is the link.
https://dokumen.pub/qdownload/problems-and-solutions-in-quantum-physics-978-981-4669-37-5-9814669377-978-981-4669-36-8.html

Zbigniew Ficek is a Quantum Field expert on Optics and you can search on https://scholar.google.com for some of his published works.
If you have any suggestions on other scholars please do share on your documents

Perhaps you are using BING AI , or wolframalpha.com to work on the basic list I made below.
There is also Matlab, Maple , Mathematica , Octave , Sage to solve calculus problems or differentials.
You can download a free Maple Player to view and collaborate if you like.
I used it at CSOM for creating Math Symbols along side LaTex
The Free Maple Player can be downloaded at https://www.maplesoft.com/products/maple/mapleplayer/

I don't like using email to share info cause it gets confusing reading all the shared links and stuff.

Just create a Google document and share it and I can keep up with your notes and you can keep up to date with mine.

So let's use email just to notify, send links, share short aspects of what you are doing, but your actual notes should be kept in a doc so I can refer to them. I shall do the same.

Ok, if we are going to work on the basics to understanding Quantum Mechanics we will need a short list of math we probably all have been exposed to or even worked with.

- Differential Equations
- Basics of Tensors
- Dirac Delta
- Vector Fields
- Gradient Divergence and Curl
- Gauss's Divergence Theorem
- Stoke's Curl Theorem
- Fourier Series
- Euler-Lagrange Equation
- Maxwell's Equations - foundational equations
- Electromagnetic Waves - the wave equation
- Schrödinger Equation
- Operators as Matrices
- Hermitian Operators
- Quantum Mechanical Angular Momentum

- Bra-Ket Notation

The reason for this list is so we can move between notations like Liebniz , Newton and Legrange etc
I can work on the Liebniz notation since that is what I learned years ago. Also, it would be much easier if each of us work on one specific part and explain it .
I picked Maxwell's Equation for my personal work. I can derive and integrate it to a field wave - on a single plane (x) and derive a wave equation. Also, I used Divergence and Curl to derive the field equation so that's why I put Gradient , Divergence and Curl as a separate topic. They are simple operators for Matrices and make calculations much easier.

Bra-Ket is a notation that I have seen used but have never approached.

I'll post the work in a more readable format than my chicken scratch chalkboard approach.

Anyhow, I'll be posting updates and sharing my notes or Maple work linked to this document.

Ciao for now ;)
11-21-2024

First update is this Maple file that can be viewed with the Maple Player
https://drive.google.com/file/d/1300RgrHOx244KnEBYay0m8pNUFLttYqH/view?usp=drive_link