PYSA21: QM project.

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Writing the report

- There should be a concise introduction to the report. What's the project about, why, how etc.
- In the report you have to explain what you did for each task and why you did that, i.e. what was the task about, what was the goal, what were the difficulties, solutions etc. From the text you write it should be clear that you understand this.
- All tasks have to be done and answered correctly before I will let you pass the course. If you need any help, please ask me or a fellow student. From the answers in the report it should be clear to me that you understand what you're talking about.
- Please send me the report electronically, in pdf format. The best way to write the report is use Latex, it's also a good exercise to make the report this way. Chances are great that you will need to use Latex again for other reports, or articles.

  If you use Latex, I will help you if you have a problem. If you chose to use other software, Word or so, you will have to do everything on your own.
- All quantities referred to in your text must be defined in the main text.
- If you use equations from the manual, please rewrite them as a numbered equation in your report, so that you can refer to them when necessary. Please do not re-derive results already derived in the manual.
- All numerical results should be in the report. The results and answers to the questions should be discussed in the main text, figures and tables are only a support to the main text. The parameters used in figures should be mentioned in the caption.
- When you give results, think about their appropriate accuracy. There is no point in supplying fifteen digits if your numerics is only good to eight digits. Too few digits can mask trends in results.
- Think about the language of Quantum Mechanics. Operators have eigenvalues and eigenfunctions but wave functions or potentials do not. Operators have expectation values with respect to different wave functions. To say that a particle has an energy means that the particle has a wave function which is an eigenfunction of the energy operator, i.e. the Hamiltonian, with that energy as an eigenvalue. There is an eigenvalue associated with every eigenfunction but not to any wave function in general. There is one or several eigenfunctions associated with every eigenvalue. In the latter case we say that the eigenvalue, not the operator or the wave function, is degenerate. An eigenfunction of an operator can belong to a set of linearly independent eigenfunctions associated with a degenerate eigenvalue of that operator. An arbitrary wave functions does not have to be an eigenfunction of any observable of a system. Etc., etc..
- If one comes to the project sessions, and works well, I will write this down and in that case one report for the group (2-3 persons) will be sufficient.
- The report should be in English.
- The report is due ten working days after the closing lecture that will take place the week after the project week.