Quantum Notes

Release 1.38

Lei Ma

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Some notes for quantum

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INTRODUCTION

Some notes continued from the full theoretical physics notes are here.

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2.1 Collections

0. Fine Structure Constant

:math: 'alpha = frac{k_mathrm{e} e^2}{hbar c} = frac{1}{(4 pi varepsilon_0)} frac{e^2}{hbar c} = frac{e^2 c mu_0}{2 h}'

In electrostatic cgs units, :math'alpha = $frac\{e^2\}\{hbar c\}'$.

In natural units, :math: 'alpha = $frac\{e^2\}\{4 pi\}$ '.

1. Hydrogen Atom

Potential $V(r) = -fracZe^2 4\pi\epsilon_0 r$.

Energy levels: :math: ' $E_{n} = -left(frac\{Z^2 \ mu \ e^4\}\{32 \ pi^2epsilon_0^2hbar^2\}right)frac\{1\}\{n^2\} = -left(frac\{Z^2hbar^2\}\{2mu \ a_{mu}^2\}right)frac\{1\}\{n^2\} = frac\{mu \ c^2Z^2alpha^2\}\{2n^2\}.$

Ground state of hydrogen atom $\psi_{100}(r)=rac{1}{\sqrt{\pi}}rac{1}{a^{3/2}}e^{-Zr/a}.$



This open source project is hosted on GitHub: quantum.