UNIVERSITY NAME

DEPARTMENT OR SCHOOL NAME

RESEARCH GROUP NAME

Thesis Title

SUBTITLE 1

Subtitle 2

Student:
John SMITH

Supervisor:
Supervisor Name

Abstract

the thesis abstract is written here (and usually kept to just this page). the page is kept centered vertically so can expand into the blank space above the title too…

Contents

Chapter 1

Title of Chapter 1

1.1 Title of Section 1

Morbi est justo, accumsan nec urna in, pharetra luctus elit. Aenean et orci urna. Praesent et eleifend augue. Integer nec accumsan nisi, vel porttitor odio. Nullam ut magna eu est fermentum accumsan. Aliquam neque lectus, tincidunt quis iaculis ac, luctus eget orci. Ut sit amet tortor lorem.

- **Item 1)**.
  Contents of Item 1.
- **Item 2**.
  Contents of Item 2

1.2 Title of Section 2

Integer sodales ultricies odio et feugiat. Nunc consequat dui vel justo ultrices tempus. Morbi fringilla urna sed tempus condimentum. Nullam congue arcu sollicitudin elementum dictum. Sed elementum nunc a pretium rhoncus. Mauris pretium condimentum augue, vitae ultrices nulla volutpat id. Integer consequat risus vulputate metus viverra semper. Donec euismod imperdiet urna, non lacinia dolor. Donec dapibus cursus ex eget consectetur. Aliquam ac magna auctor, ullamcorper nibh ut, sodales leo. Proin metus mauris, venenatis sit amet imperdiet ac, lobortis in neque.

As seen on figure 1.1

Figure 1.1: Figure description

1.3 Title of Section 3

Nulla ultricies ante vehicula, porta leo sed, lobortis purus. Maecenas et tellus massa. Duis cursus, elit a iaculis faucibus, eros libero accumsan diam, quis cursus massa est eu metus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. In hac habitasse platea dictumst. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Etiam luctus dapibus diam sit amet elementum. Phasellus eget velit in eros convallis sagittis. Morbi tempus, eros ut rutrum efficitur, sem augue facilisis augue, ullamcorper egestas est erat sed ligula. Mauris nibh purus, porttitor eu semper non, lacinia sit amet elit. Vestibulum nec erat non erat ornare placerat non nec eros. Sed molestie ultrices mauris quis sagittis. [1–5].

Chapter 2

Title of Chapter 2

Fusce ligula purus, interdum sed pharetra eu, tincidunt quis dui. Duis auctor, sem vel efficitur eleifend, erat nunc pharetra quam, eget venenatis sapien dui vel velit. Aenean varius sed sapien quis rutrum. Ut quis semper diam, vitae tristique est. Sed ullamcorper mollis turpis id facilisis. Morbi convallis nibh dolor, ut semper est hendrerit ut. Ut ultricies iaculis erat. Phasellus facilisis ex et augue rhoncus, non aliquam dolor cursus. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Integer ac sem elit. Nam varius ac elit ut accumsan. Cras purus erat, elementum id magna eu, lobortis pellentesque sapien. Pellentesque finibus arcu et vestibulum posuere. Quisque metus dui, porta a sagittis vel, euismod a nisl.

Showing equation 1:

$$\mathcal{L}(t_1, t_2, ..., t_{16}) = \frac{1}{N_{norm}} \prod_{\nu=1}^{16} \exp\left(-\frac{(\mathcal{N}\langle\psi_\nu|\hat{\rho}_p(t_1, t_2, ..., t_{16}|\psi_\nu\rangle - n_\nu)^2}{2\mathcal{N}\langle\psi_\nu|\hat{\rho}_p(t_1, t_2, ..., t_{16}|\psi_\nu\rangle}\right) \tag{2.1}$$

Showing equation 2:

$$i\hbar\frac{\partial\Psi(\mathbf{r},t)}{\partial t} = \left[-\frac{\hbar^2}{2m}\nabla^2 + V(\mathbf{r})\right]\Psi(\mathbf{r},t) \tag{2.2}$$

Showing equation 3:

$$\mathbf{E}(r,z) = E_0\,\hat{x}\,\frac{w_0}{w(z)}\exp\left[\frac{-r^2}{w(z)^2}\right]\exp\left[-i\left(kz + k\frac{r^2}{2R(z)} - \psi(z)\right)\right] \tag{2.3}$$

Showing equations with Dirac notation:

$$\hat{H}|\psi(t)\rangle = i\hbar\frac{\partial}{\partial t}|\psi(t)\rangle \tag{2.4}$$

$$\langle\psi(t)|\hat{H} = -i\hbar\frac{\partial}{\partial t}\langle\psi(t)| \tag{2.5}$$

$$W(x,p) \stackrel{\text{def}}{=} \frac{1}{\pi\hbar}\int_{-\infty}^{\infty}\psi^*(x+y)\psi(x-y)e^{2ipy/\hbar}\,dy \tag{2.6}$$

$$|\Psi(t)\rangle = \sum_n c_n(0)e^{-iE_nt/\hbar}|\psi_n\rangle, \tag{2.7}$$

$$\begin{aligned}\left|\psi^{(2)}_{proj}(h_1,q_1,h_2,q_2)\right\rangle &= \left|\psi^{(1)}_{proj}(h_1,q_1)\right\rangle\otimes\left|\psi^{(1)}_{proj}(h_2,q_2)\right\rangle \\ &= a(h_1,q_1)a(h_2,q_2)|HH\rangle + a(h_1,q_1)b(h_2,q_2)|HV\rangle \\ &+ b(h_1,q_1)a(h_2,q_2)|VH\rangle + b(h_1,q_1)b(h_2,q_2)|VV\rangle\end{aligned} \tag{2.8}$$

$$\hat{\mu}_0 = |H\rangle\langle H| + |V\rangle\langle V| \tag{2.9}$$

$$\langle\psi_\nu|M_\nu|\psi_\nu\rangle = \sum_\lambda (B^{-1})_{\lambda\nu}\underbrace{\langle\psi_\nu|\hat{\Gamma}_\mu|\psi_\nu\rangle}_{B_{\mu,\lambda}} = \sum_\lambda \underbrace{B_{\mu,\lambda}(B^{-1})_{\lambda,\nu}}_{\delta_{\mu,\nu}} \tag{2.10}$$

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