Matthew Rossetter

Curriculum Vitae

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MASTERS THESIS

"CP Violation In And Beyond The Standard Model"

In this preliminary report, we test the Two Higgs Doublet Model (2HDM) of Type II as an extension of the Standard Model (SM) using indicative flavour observables, with particular focus on leptonic decays of B and D mesons, $B\bar{B}$ mixing, and the $b \to s\gamma$ radiative decay. Testing the 2HDM parameter space m_{H^+}, $\tan\beta$ to find alignment between theoretical calculations and experiment, constraints on the parameters were found for the above flavour phenomena both individually and then as a global fit. Strongly dominated by the $b \to s\gamma$ branching ratio, the mass of a charged Higgs particle would be expected to lie between 370 GeV and 891 GeV. The 2HDM vacuum expectation value ratio $\tan\beta$ is calculated to lie between 2.16 and 33.0. Discussions on the goals of the study from here are ongoing, likely a further study into the 2HDM and its validity as a SM extension.

EDUCATION

2016 – PRESENT **Master of Physics**

STATEMENT OF MARKS:

- THIRD YEAR - 2:1 (69%)
- SECOND YEAR - 1ST (77%)
- FIRST YEAR - 1ST (72%)

Theoretical Physics
University of Durham

2009 – 2016 **Secondary Education**

- Advanced Highers - A in Physics, Maths, Chemistry, and English
- Highers - A in Physics, Chemistry, Biology, Maths, and English
- National 5s - 7 As and 1 C including Maths, Physics, and English at A

The High School of Glasgow

WORK EXPERIENCE

CURRENT, FROM OCT 2018 (PT)

Freemans Quay Leisure Centre
Casual Leisure Assistant/Lifeguard

The challenge of being a lifeguard is in the potential for life-or-death situations. As a lifeguard, I present a positive leisure experience, which will focus on dealing with any customer issues and maintaining an enjoyable environment for all. This must be balanced with a constant vigilancy over the pool area in case of the need for intervention or rescue, with the proper knowledge and ability to save any lives that may be at risk.

CURRENT, FROM OCT 2017 (PT)

St Mary's College Bar
Bar Staff

I am firstly responsible for serving and interacting with customers. This requires developing keen social skills to balance a friendly atmosphere for customers with a presence of authority to those who may cause trouble. It is important to maintain a high level of cleanliness in a frequently

AWARDS

2019 President's Vote of Thanks, and Full Colours
St Mary's College, Durham University

2018 BIIAB Level 2 Award for Personal License Holders

2017 RLSS National Pool Lifeguard Qualification

2016 British Red Cross Emergency First Aid and ITC Outdoor First Aid

2015,16 National Finalist and Company President at UK Space Design Competition

2014,15 CREST Bronze & Silver Science Awards

COMPUTER SKILLS

BEGINNER	Perl, HTML, Fortran
INTERMEDIATE	Microsoft Windows and Office, C++
EXPERT	Python, Unix, LaTeX

SKILLS

Goal Oriented

Understanding tasks properly is important to me. Performing these tasks properly is important to an efficient running of a workspace. I listen to all viewpoints and use my judgement to act and achieve goals quickly and efficiently.

Dedicated

I believe in performing all tasks to the best of my ability. As part of any workplace, I dedicate myself fully to the task at hand. Focusing on what task needs done and always putting the complete effort needed towards its completion results in a better job being performed, likely taking less time and resources while being of higher quality.

Passionate

I have been interested in theoretical physics such as quantum mechanics and particle phenomenology from an early age. My education and research have cemented this interest into a passion. I greatly enjoy carrying out fundamental physics research with potential practical applications.

Friendly and Sociable

I have spent a lot of time working in customer service and enjoy interacting with people of all backgrounds. I have learned how to deal with many possibly difficult situations and understand how to defuse tense scenarios.

Manual Handling

I have recieved manual handling training from several of my previous employers and am comfortable performing tasks that require this. I am comfortable switching from more inactive jobs and tasks to highly active ones.

messing environment, and keep a mind for potential welfare issues such as binge drinking which must be monitored and reported.

SEP 2018 – JULY 2019 (PT)

St Mary's College Bar
Bar Steward

Over the academic year 18/19, I was in charge of the college bar with duties such as stock control, staff hiring and training, shift assignment, and maintainence and cleaning. I was selected for my strong work ethic and commitment to the role, and developed skills into this management role to improve the college bar to bring in more customers and create a safer and more efficient working environment for staff. When managing staff who were also my peers, it was important to find the proper balance in the workplace so I would be taken seriously in my role as their manager.

REFERENCES

Dr. Alexander Lenz

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University of Durham

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Dr. Qing (Helen) He

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Mustafa Gun

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EMPLOYER *St Mary's College*
University of Durham

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ADDITIONAL EXPERIENCES

Quarkonia Modelling

Throughout my degree course, I have had several courseworks that have required extensive Python programming, thus far leading up to the year-long project in my Third Year, where I modelled the early (n,l) wavefunctions for a Hydrogen atom, and then applied this modelling to Quarkonia phenomena. I was able to calculate good approximations for several lower state masses, with the inclusion of hyperfine splitting. A full repository of this study can be found at https://github.com/mbr-phys/quarkonium.

Python Tutoring

As part of my fourth year, I have volunteered to help as a tutor in First Year programming workshops, assisting in teaching the new students the fundamentals of Python programming for physics. I put my knowledge of Python to good use in sharing it with newer students, and this has allowed me to gain a better understanding of the language in requiring to teach it.