Ryan Moodie

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Education

Current – Oct 2017 **MASt in Applied Mathematics (Part III Maths), University of Cambridge**
I am studying the courses: Advanced Quantum Field Theory; Black Holes; General Relativity; Quantum Field Theory; Symmetries, Fields and Particles; Statistical Field Theory; The Standard Model; String Theory; and Supersymmetry.

Jun 2017 – Sep 2013 **MPhys (Hons) in Theoretical Physics, University of St Andrews**
Classification: **First**

Research Projects

Jun 2017 – Jan 2017 Supervisor: **Dr Jonathan Keeling**, University of St Andrews
Undergraduate final year project
I investigated continuous symmetries in coupled light-matter systems, writing a generalised theory whose limiting cases reproduce known Dicke models and classifying its phases in the extended parameter regime. I was funded by the university to continue working on the project over the summer, finding a rich phase diagram exhibiting $U(1)$ symmetries. A paper has been submitted to Phys. Rev. A; the preprint is on arXiv: Generalized classes of continuous symmetries in two-mode Dicke models.

Aug 2016 – Jun 2016 Supervisor: **Dr Jonathan Keeling**, University of St Andrews
Laidlaw Undergraduate Internship Programme in Research and Leadership
I explored the polarisation behaviour of photon BECs following recent experiments at Imperial, generalising an existing model's quantum master equation to derive rate equations and numerically simulate them. My funding award involved leadership training recognised by the Institute of Leadership and Management. I continued working on the project this year to explain the significant change in polarisation degree at threshold which I found, now published in Phys. Rev. A: Polarization dynamics in a photon Bose-Einstein condensate.

Aug 2015 – Jun 2015 Supervisor: **Dr Brendon Lovett**, University of St Andrews
Engineering and Physical Sciences Research Council Award
I theoretically investigated the quadrupole and exchange coupling between donor electrons in silicon as part of the research towards realisation of quantum computation, in collaboration with experiments at UCL. This involved calculating the wavefunctions of two electrons using a self-consistent method based on a Schrödinger-Poisson solver to determine the interaction between them.

Selected Academic Awards

2016/17 **Theoretical Physics Project Prize**
Awarded for the best final year Theoretical Physics project.

2016/17 **Theoretical Physics Project Poster Prize**
Awarded for the best final year Theoretical Physics project poster presentation.

2016/17 **Medal (Theoretical Physics Fifth level)**
Awarded to the highest graded student in Fifth level Theoretical Physics.

2014/15 **Medal (Physics Third level)**
Awarded to the highest graded student in Third level Physics.

2014/15 **William David Brodie Prize**
Awarded to the three most outstanding students in the School's Junior Honours class.

Skills, Positions of Responsibility and Achievements

Proficient in programming (primary language: Python)
and related systems (Linux, Git, LaTeX, Mathematica)
School of Physics and Astronomy, University of St Andrews:
Theoretical Physics Master's representative on Student Staff Council
School ambassador
Outreach
Gold Duke of Edinburgh's Award
Diploma of the London College of Music in pianoforte solo performance