

# Ross Knapman

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## Personal Information

Date of Birth 15<sup>th</sup> July 1997  
Place of Birth Northallerton, United Kingdom  
Nationality British  
Last Updated November 2021

## Education

2019–Present **PhD**, *Johannes Gutenberg-Universität Mainz*, Mainz, Germany.  
Preliminary Title: Creation of Topological Magnetic Structures by Electrical Means.  
Primary Supervisor: Prof. Dr. Karin Everschor-Sitte.  
Secondary Supervisor: Prof. Dr. Jairo Sinova.

2015–2019 **Master of Physics**, *Durham University*, Durham, United Kingdom, *First Class Honours* (best possible grade).  
Master's Project: Micromagnetic Simulations of Antiskyrmions.  
Master's Project Supervisor: Prof. Peter Hatton.

2013–2015 **A Levels**, *Paston Sixth Form College*, North Walsham, United Kingdom, *A\*A\*A\*Aaa* (see explanation at bottom).  
Physics, Chemistry, Mathematics, Further Mathematics, AS Biology, AS Critical Thinking.

2011–2013 **GCSEs**, *Broadland High School*, Hoveton, United Kingdom, *7A\**, *3A* (see explanation at bottom).

## Experience

### Work Experience

07/2018–08/2018 **Computational Condensed Matter Physics Internship**, *Durham University*, Durham, United Kingdom.  
Undertook a computational project under the supervision of Prof. Tom Lancaster, investigating the magnetic fields experienced by muons when embedded in skyrmion-like spin textures. The bulk of this was the development of a Python module in C++ to aid in quickly investigating various dipole moment structures.

06/2017–09/2017 **DAAD RISE Research Internship**, *German Aerospace Center (DLR) Oberpfaffenhofen*, Weßling near Munich, Germany.  
A highly competitive research placement funded by the DAAD, working as part of a small team developing a lidar system to detect atmospheric turbulence from aircraft. The work involved ground-based measurements and data analysis. Supervised by Dr. Jonas Herbst and Dr. Patrick Vrancken.

06/2016–08/2016 **Galaxy Survey Visualisation Internship**, *University of Queensland*, Brisbane, Australia.

Production of virtual reality mobile apps to visualise galaxy redshift surveys. Worked primarily with C#, and participated in discussions with researchers in cosmology. Supervised by Dr. Ed Macaulay.

07/2014 **Work Experience in Post-Processing**, *Met Office*, Exeter, United Kingdom.

Week-long work experience placement tasked with analysis of data using IDL, as well as teamworking activities.

10/2013–01/2014 **Work Experience**, *John Innes Centre*, Norwich, United Kingdom.

Undertook weekly half-day work experience sessions, assisting with experiments and discussing ongoing research with experts in plant and microbial science, and genomics.

### Teaching

WS 2020–21 **Tutor**, *Experimental Physics 5c (Condensed Matter Physics)*, Prof. Jure Demsar.

SS 2020 **Senior Assistant**, *Mathematical Calculation Methods*, Prof. Dr. Jairo Sinova and Dr. Karin Everschor-Sitte.

WS 2019–20 **Tutor**, *Experimental Physics 5a (Atomic and Quantum Physics)*, Prof. Randolph Pohl.

### University Societies

2018–19 **Co-President**, *Durham University Physics Society*.

2018–19 **Secretary**, *Durham University Astronomical Society*.

2017–18 **Treasurer**, *Durham University Astronomical Society*.

2016–18 **Publicity Officer**, *Durham University Physics Society*.

2016–17 **Webmaster**, *Durham University Astronomical Society*.

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### Awards

September 2021 **Third Place, IOP Publishing Emerging Leader Celebration 2021.**

Awarded for my poster showing results from our work proposing a protocol to create H-shaped skyrmions, held on Twitter.

May 2021 **Studienstiftung des deutschen Volkes Doctoral Scholarship.**

Doctoral scholarship given to students "who, because of their exceptional academic or artistic talents and personal qualities, can be expected to make an outstanding contribution to society as a whole". In addition to funding living expenses, the programme offers many opportunities for students to build their skills and network.

Jul 2019 **Florence Nightingale Prize for Graphical Excellence.**

Prize worth £100, given to one student in each year group per year at Durham University. Awarded for excellence in the illustration of antiskyrmion resonance modes in my Level 4 project report.

Apr 2017 **DAAD RISE Scholarship.**

The Research Internships in Science and Engineering (RISE) scholarship awarded by the DAAD is a prestigious scholarship that funds research placements in Germany, including living expenses, a travel allowance, and a conference in Heidelberg.

Feb 2015 **Silver in 2015 UK Chemistry Olympiad.**

Nov 2014 **Silver in 2014 UKMT Senior Mathematical Challenge.**

Sep 2013 **Sir William Paston Scholarship.**

Scholarship awarded by The Paston College Foundation worth £500 in recognition of outstanding GCSE results.

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## Publications

**Journal of Physics D: Applied Physics** **54**, 404003, *R. Knapman, D. R. Rodrigues, J. Masell, and K. Everschor-Sitte.*

Current-induced H-shaped-skyrmion creation and their dynamics in the helical phase

**Physical Review Applied** **16**, 014020, *D. R. Rodrigues, J. Nothhelfer, M. Mohseni, R. Knapman, P. Pirro, and K. Everschor-Sitte.*

Nonlinear Dynamics of Topological Ferromagnetic Textures for Frequency Multiplication

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## Workshops, Schools, and Conferences Attended

- November 2021 **Studienstiftung Herbstforum Gesellschaft & Natur 2021 für Promovierende, Online.**  
Talk: Tying Knots in Magnets: Investigating Skyrmions and Hopfions.
- October 2021 **Joint School on Spin Physics (JSSP), Apolda, Germany.**  
Poster Contribution: Current-Induced H-Shaped Skyrmion Creation and Their Dynamics in the Helical Phase.
- October 2021 **Parallel Programming Workshop (MPI, OpenMP and Advanced Topics), Online.**  
Five-day workshop on parallel computing using MPI and OpenMP.
- September–October 2021 **DPG Meeting of the Condensed Matter Section, Online.**  
Talk: Current-Induced H-Shaped Skyrmion Creation and Their Dynamics in the Helical Phase.
- July 2021 **Deep Learning and Acceleration with OpenACC on Nvidia GPUs, Online.**  
Four-day workshop covering the fundamentals of deep learning, using Horovod to distribute deep learning over multiple GPUs, as well as using OpenACC to accelerate C/C++ code on GPUs.
- June 2021 **Vom Defizit zum Dialog: Einführung in die Wissenschaftskommunikation, Online.**  
Two-day Studienstiftung workshop on scientific communication with the public including lectures and group activities.
- March–April 2021 **Do Research Like a Munchkin, Online.**  
Workshop on Agile software development and clean code, with emphasis on applying these concepts to the broader topic of research, not necessarily just in software development.
- February 2021 **Exciting Dynamics: How Electrons, Spins, and Phonons Interact, Online.**  
Poster Contribution: On-Demand Production of 3D Magnetic Textures by Electrical Means.
- September–October 2020 **2020 European School on Magnetism, Online.**  
Series of lectures on various topics within magnetism.
- September 2020 **How to Shape Your Future: Career Planning for PhD Students, PhDs and Postdocs, Online.**  
Career planning workshop aimed primarily at early career researchers.

- September **Intercultural Communication**, *Online*.  
 2020 Workshop by Alexia Petersen on overcoming the challenges faced during cross-cultural communication and the reasons behind such challenges.
- December **British-German WE-Heraeus-Seminar: Skyrmions in Magnetic Materials**, *Bad Honnef, Germany*.  
 2019 Poster Contribution: Production of Magnetic Textures in Different Dimensions.

## Skills

### Language Skills

- English Native
- German Conversational Knowledge *Self-Taught & 6 Months' B2 (Upper Intermediate) Lessons*
- French Elementary Knowledge *GCSE Grade A, Subsequent Self-Learning*

### Computer Skills

- Programming Python (very good), Shell (very good), C++ (fair), Java (fair), C# (fair).
- OS GNU/Linux (Arch, Ubuntu, very good), macOS (very good), Windows (fair).
- Simulation MuMax<sup>3</sup> (very good), OOMMF (fair).
- Calculation Microsoft Excel (very good), Mathematica (fair).
- Graphics ParaView (very good), Blender (good), Inkscape (good), Processing (good).
- Documents L<sup>A</sup>T<sub>E</sub>X (very good), Microsoft Word (very good).
- Presentation Keynote (very good), Microsoft PowerPoint (very good), reveal.js (good).

## Explanation of Grading Schemes

These explanations are correct as of when I took the qualifications (2013 for GCSEs, 2014 for AS Levels, 2015 for A Levels, 2019 for degree), rather than for newer systems introduced since (though I use present tense regardless).

### Degree

Integrated master's degrees at Durham University are four years long, and one does not explicitly receive a bachelor's beforehand. The second, third, and fourth years of the degree are weighted 2:3:4 in terms of calculating the overall degree result (the first year is not counted). The overall raw marks to obtain each grade is shown in the table below.

| Grade                      | Raw Mark Percentage |
|----------------------------|---------------------|
| First Class Honours        | >70                 |
| Upper Second Class Honours | 60-69               |
| Lower Second Class Honours | 50-59               |
| Third Class Honours        | 40-49               |
| Fail                       | <40                 |

### A Levels

A Levels are usually taken over two academic years between the ages of 16 and 18 during sixth form, which is the step between high school and university. AS Levels are awarded after the first year of study, and constitute half an A Level. A Levels are awarded after a further year of study of the subject (A2 units). Typically, students take four A Levels to begin with, and "drop" one subject at the end of the first year, so that they obtain three A Levels and one AS Level overall. No subjects are compulsory; they are all freely chosen by the student.

In order to calculate the grade, the raw marks are first scaled according to factors such as the difficulty of the exam relative to that of other exam boards for the same subject, as well as the marks obtained by students around the country, and this scaled mark is converted into a Uniform Mark Scale (UMS) mark. The percentage obtained from the UMS mark is then used to determine the grade to award, as shown in the table below.

| Grade        | Percentage UMS                               |
|--------------|--|
| A*           | >90 average in A2 units, >80 average overall |
| A            | >80  |
| B            | 70-79  |
| C            | 60-69  |
| D            | 50-59  |
| E            | 40-49  |
| U (ungraded) | <40  |

AS Levels are graded in the same way, except that there is no A\* grade; the highest possible grade is an A (80+%).

### GCSEs

GCSEs are usually taken between the ages of 14 and 16 during high school and are compulsory for every student in England, Wales, and Northern Ireland. This is in contrast to A Levels, for which there exist less academic options and more technical options (e.g. BTECs). Students typically take 10 GCSEs, of which six are compulsory (such as mathematics and religious studies), and four are chosen freely (such as geography and French). The possible grades are A\* being the highest, then A through G, then U being a fail (ungraded).

I obtained A\*s in Physics, Chemistry, Biology, Mathematics, Geography, Religious Studies, English Language, and As in English Literature, Information Technology, French.