Brendan J. Arnold

CONTACT INFORMATION

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EDUCATION

Bristol University, Bristol, Avon, UK

2.i BSc hons. Physics with study in Continental Europe, 2001 – 2005

Université Paul-Sabatier, Toulouse, France

ERASMUS sandwich year studying physics in French, 2003 – 2004

Franklin Sixth Form College, Grimsby, N.E. Lincs, UK

5 A-Levels grades A (Maths), B (Physics), B (Law), C (English Lang.), D (French), 1998 – 2001

RESEARCH INTERESTS

I plan to begin a PhD placement at TCD studying the electronic structure of spin-electronic material candidates using synchrotron radiation.

Ferromagnetic semiconductors as spin-electronic material candidates are of great interest to industry. The resulting spin-electronic transistor devices could be built using techniques similar to those employed on existing semiconductor production lines.

Using Soft X-ray Emission Spectroscopy (SXES) on a thin film of ferromagnetic material it is possible to obtain the Resonant Inelastic X-ray Scattering (RIXS) spectrum. This spectrum, formed from interference between emission and adsorption spectra, can be used to determine the electronic structure of sample atoms. Further selectivity can be obtained by honing in on certain spin and orbital angular momentum orientations using polarised X-ray sources in a technique known as X-ray Magnetic Circular Dichroism (XMCD) spectroscopy. Photon-in/photon-out techniques such as SXES and XMCD are unaffected by applied magnetic and/or electric fields, making studies of the magnetic properties of materials viable.

At TCD I hope to study some material candidates for spin-electronic devices, such as Cu-doped GaN, Mn-doped AlN and Mn-doped GaN, using the above spectroscopy techniques as well as laboratory based techniques.

PREVIOUS LABORATORY EXPERIENCE

Shadowing PhD students at MAX-lab, Lund, Sweden **28 April 2006 – 30 April 2006**
I spent two night shifts observing TCD students working under Dr. Cormac McGuinness and Prof. Iggy McGovern in work that closely echoes my proposed PhD research. At the MAX-lab beamline, I observed fault diagnostic work, result taking and preliminary analysis of results.

An Affordable Particle Detector for Education **October 2004 – August 2005**
I spent two days a week on adapting industrial designs for Resistive Plate Chambers (RPC) for use in secondary schools. It involved theoretical study into electrical breakdown of gases, cosmic rays and muon chamber technologies. The practical side involved designing and implementing a novel RPC design as well as calibrating and troubleshooting the device. I continued working on the project in the summer in my own time, performing further tests on calibration detectors for next years students.

Undergraduate laboratory **October 2001 – June 2005**
This involved weekly lab sessions covering a broad range of topics including optics, thermody-

namics, acoustics, electronics and fluid dynamics.

Personal Statement

Although I am working this year, I maintain a keen interest in physics. I am an active member of the student physics society at Bristol and attend many of the events across the country such as visits to the JET facility in Culham and formal dinners in London. Earlier this year I visited the Fritz Haber Institut (part of the Max Planck Institut) and the Einstein exhibition in Berlin.

I spent the third year of my degree studying Physics in Toulouse, France as part of the ERASMUS scheme. I attended lectures and laboratory sessions alongside people who spoke little or no English. As well as improving my language skills, the experience was highly enjoyable and valuable in terms of learning more about international collaboration. I enjoy travel and learning languages greatly and am looking for a PhD preferably outside of England.

During the past three months in work I have been responsible for setting up and fine-tuning Solaris and Windows servers owned by the Bristol University Estates Department. As the server administrator, I work as part of the I.T. team to bring to the department a key service which is efficient and secure. My work involves much liaising with heads of other departments to identify their requirements and to pool their ideas.

Responsibility and task management is further evidenced by my experience as a pilot. I have held a private pilots license for over five years and have flown many times in the UK, France and Canada. This taught me to deal with stress, manage my workload and communicate effectively. I have loved flying from a very early age.

Having lived in Bristol on a narrowboat for nearly two years I have applied my skills to many problems that were not purely academic in nature. Examples include planning and implementing electrical, gas and water systems, managing these systems on a daily basis and performing other routine maintenance. I also have helped to form a strong boating community where we help each other out and exchange ideas. The boat has proved to be a highly enjoyable project and I have enjoyed my time living afloat.

Referees

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