

# Jonathan Andrew Pearson

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## Personal details

**Date of birth** March 1<sup>st</sup>, 1988

**Current age** 21

**Nationality** British

**Home address** Keepers Cottage, Brockhill Lane, Redditch, Worcs, UK, B97 6RA

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## Education

2009-2012 **Doctor of Philosophy** (to be completed)

- **The University of Manchester**, Jodrell Bank Centre for Astrophysics.
- **Research**: Interest in theoretical cosmology, with working thesis title *dark energy models and fundamental physics*. Particular interest in elastic dark energy models, spontaneous symmetry breaking & topological defects in cosmology.
- **Supervisor**: Dr.R.A.Battye
- **Teaching**: Currently tutoring two groups of 3 1<sup>st</sup> year undergraduates: core mathematical modules: *maths 1 & 2, dynamics, electricity and magnetism*.

2005 - 2009 **Undergraduate masters degree**

- **The University of Manchester** Physics with Theoretical Physics 1<sup>st</sup> class: MPhys (hons).
- **Selection of sub-disciplines studied**: Advanced statistical physics (90%), Bose & Fermi gases (95%), complex variables & integral transforms (90%), early universe (100%), electrodynamics (92%), fluid mechanics (82%), gravitation (90%), lagrangian dynamics (88%), quantum mechanics of atoms & molecules (81%), relativistic quantum physics (82%), solid state physics (92%), symmetries in physics (88%) & various mathematical methods courses.
- **Year long MPhys project**: Supervised by Dr.R.Battye, with title *scaling dynamics of charged domain walls*. Project involves evolving equations of motion with various potentials, with various numbers of interacting fields, whilst investigating the scaling dynamics of resulting topological defects. Numerical work uses Fortran77 & C<sup>++</sup>. Grade for project: 88%

2003 - 2004 **Diploma**

- **The Open University** Diploma in Mathematics (B): Dip.Maths(Open)
- **Selection of sub-disciplines studied**: Group theory, mathematical modelling, affine geometry, linear algebra, inverse geometry.

2001 - 2003 **A levels**

- **Richmond College** Maths (A), Physics (A), Chemistry (D), Further Maths (B)

## Publications

- Formation and evolution of kinky vortons (with R.A.Battye, S.Pike and P.M.Sutcliffe)  
JCAP09(2009)039 arXiv:[hep-th/0908.1865v1](http://arxiv.org/abs/hep-th/0908.1865v1) (preprint)
- Charge, junctions and the scaling of domain wall networks (in preparation): with R.A.Battye
- Stability of *X*-type junctions (in preparation): with R.A.Battye and A.Moss

## Talks

- PhD introductory classes at JBCA: "*evolution of topological defects in field theory*"
- UK Cosmology Conference: King's College London, 18/11/09, "*formation and evolution of kinky vortons*"

## Skills

- Can program in C++ & Fortran77, mainly for scientific purposes.
- Able to competently use various operating systems: Mac OS X, Unix & Windows XP.
- Use mathematical, graphing & typesetting packages, including Mathematica, GnuPlot, SuperMongo & L<sup>A</sup>T<sub>E</sub>X.
- Proven competency in self-learning mathematical, physical, computational methods; also in conveying complex ideas & techniques to peers.

## Academic achievements of note

- **Summer 2008, 8 week research project:** *Cosmic texture*. Project involved using Fortran77 and JPL's HEALPix software to populate a sky map with texture "spots" having pre-determined temperature profiles, and then finding subsequent power spectrum; as well as literature research. Supervised by Dr.R.Battye, of the Theoretical Cosmology Group, Jodrell Bank Centre for Astrophysics.
- **Summer 2007, summer school:** Chosen as one of 30 world-wide delegates at *International Undergraduate Summer School*, hosted by the University of Sheffield, funded by PPARC. Lectures on particle physics & cosmology, with a 4 week project on *quintessence models of dark energy*. Numerical work used Maple.
- **Spring 2007, project for degree:** On the physics of neutron stars. Involved scientific usage of C++ to numerically solve differential equations.
- **Degree status:** Exam mark average consistently above 80%, graduated in the top 2 students. Started university 1 year early.
- **Online degree notes:** Creating & maintaining an online physics resource ([www.jpoffline.com](http://www.jpoffline.com)), hosting my original works & typeset lecture notes. Some notes are now used by lecturers, as hand-outs.
- **Pre-university education:** One will notice that all qualifications gained before university were at least 3 years "early". Delegate at Stanford University's Education Program for Gifted & Talented Youth, summer 2002 (youngest & one of 3 nationwide to receive a full scholarship from Warwick University, UK).

All reports & projects mentioned (and those unmentioned) may be found on the afore mentioned site [www.jpoffline.com](http://www.jpoffline.com).

## Non-academic notes

- Holder of full, clean UK drivers license.
- Volunteer work at Lee Abbey Youth Camps; a Christian charity. Pastoral care of children, creating multimedia entertainment resources. Also website manager for <http://camps.leeabbey.org.uk>.
- Attend Ivy Cottage church, Manchester. At the church, led small group discussions on a weekly basis; played bass guitar in the band; organised publicity events.
- 2004-2005: Holding the full time position of *booking & scheduling coordinator*, at the NHS Alexandra Hospital, Redditch; phasing in the government initiative for patient choice. Responsible for in- and out-patient waiting lists, informing patients, data handling, inter-department liason.

## Referees

### *Phd Supervisor:*

Dr.R.A.Battye,  
Jodrell Bank Centre for Astrophysics,  
University of Manchester,  
Oxford Road,  
M13 9PL

### *Personal Tutor:*

Prof.A.Pilaftsis,  
Schuster Laboratory,  
University of Manchester  
Oxford Road,  
M13 9PL