Jonathan Davis

(Updated: March 10, 2015)

Name	Jonathan Henry Maynard Davis	Nationality	British
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Research Summary

I have published articles individually and with collaborators on Dark Matter detection theory and phenomenology in various high impact factor journals, with **2 PRL, 2 JCAP and 2 PRD**.

- **Astrophysical probes of Dark Matter interactions** - I showed in PRL 114, 051303 that the interaction between Dark Matter and photons can be studied through the scattering of diffuse light around galaxies.
- **Direct detection anomalies** - I provided an explanation for the DAMA annual modulation in terms of neutrons in PRL 113, 081302, and was the first to show that the CoGeNT Dark Matter 'signal' is fully consistent with background surface events in JCAP 08(2014)014.
- **Direct detection statistics** - A robust Bayesian and frequentist treatment of the surface event background for CoGeNT in JCAP 08(2014)014 and an analysis of the neutrino background for future experiments in JCAP 03(2015)012. Also a Bayesian analysis of XENON100 data in PRD 89 043505.

Employment

October 2014 – Present	Postdoctoral Researcher, Institut d'Astrophysique de Paris, France
May 2014 – October 2014	Postdoctoral Researcher, Institute for Particle Physics Phenomenology, Durham University, United Kingdom

Education

October 2010 – May 2014	PhD *'The Character of Dark Matter'*, Institute for Particle Physics Phenomenology, Department of Physics, Durham University, United Kingdom.
2006–2010	MPhys Physics (First Class), University of Warwick, United Kingdom.

Awards

2014	STEP award (STFC) for funding between March and October 2014 at IPPP, Durham.
2010	Styles prize for **best overall performance** in the MPhys degree at Warwick.

Publications

December 2014 (Pub. 03/15)	Jonathan H. Davis, **Dark Matter vs. Neutrinos: The effect of astrophysical uncertainties and timing information on the neutrino floor**, arXiv:1412.1475, JCAP 03(2015)012
October 2014 (Pub. 02/15)	Jonathan H. Davis and Joseph Silk, **Glow in the Dark Matter: Observing galactic halos with scattered light**, arXiv:1410.5423, Phys. Rev. Lett. 114, 051303 ***(Editors' Suggestion)***
July 2014 (Pub. 08/14)	Jonathan H. Davis, **Fitting the annual modulation in DAMA with neutrons from muons and neutrinos**, arXiv:1407.1052, Phys. Rev. Lett. 113, 081302 ***(Editors' Suggestion)***
May 2014 (Pub. 08/14)	Jonathan H. Davis, Christopher McCabe and Céline Bœhm, **Quantifying the evidence for Dark Matter in CoGeNT data**, arXiv:1405.0495, JCAP 08(2014)014
June 2013	Jonathan H. Davis and Céline Bœhm, **Searching for GeV-scale new Gauge Bosons in QGP thermal dilepton production**, arXiv:1306.3653
August 2012 (Pub. 01/14)	Jonathan H. Davis, Torsten Enßlin and Céline Bœhm, **A New Method for Analysing Dark Matter Direct Detection Data**, arXiv:1208.1850, Phys. Rev. D 89 043505
March 2012 (Pub. 06/13)	Jonathan H. Davis, Céline Bœhm, Niels Oppermann, Torsten Enßlin and Thomas Lacroix, **XENON100 exclusion limit without considering L_{eff} as a nuisance parameter**, arXiv:1203.6823, Phys. Rev. D 86 015027

Conference Talks and Seminars

I have given seminars at 8 institutions throughout Europe and have spoken at 5 international conferences.

	Dark Matter vs. Neutrinos
16 Jan 2015	*Conference talks:* Beyond ΛCDM – Oslo, Norway
	DAMA and CoGeNT without Dark Matter
	Seminars:
19 Nov 2014	Université de Liège, Belgium
30 Oct 2014	Niels Bohr Instituttet Copenhagen, Denmark
17 Oct 2014	University of Nottingham, UK
24 Sep 2014	Universität Zürich, Switzerland
18 Aug 2014	CP3-Origins Odense, Denmark
	A CoGeNT analysis: Is there evidence for a Dark Matter signal?
	Conference talks:
1 July 2014	Higgs Symposium – Edinburgh, UK
26 June 2014	TeVPA/IDM Astroparticle Physics – Amsterdam, Netherlands
8 April 2014	IOP Joint HEPP-APP Meeting – Royal Holloway, UK
28 March 2014	Moriond Cosmology – La Thuile, Italy
	Seminars:
6 March 2014	Oxford University, UK
13 Feb 2014	Institut d'Astrophysique de Paris, France
31 Jan 2014	IPPP, Durham University, UK

Teaching and Outreach

2011–2013	Speaker at Particle Physics Masterclass Outreach Event in front of over 100 A-level students.
2012–2013	Mathematical Methods 2 – 2nd year undergraduate workshop supervisor (Durham University)
2011–2012	Foundations of Physics 2B - 2nd year undergraduate workshop supervisor (Durham University)
2011, 2012	Supervisor of week-long Bridge Project for two groups of five first year undergraduates on the topic of 'What are the factors affecting the height of a water rocket?' (Durham University)
2010–2011	Particle Theory - Marking of work from 4th year undergraduates (Durham University)

Academic Activities

Oct. 2013	Visitor at Johns Hopkins University, Baltimore, USA.
Dec. 2012	Member of the organising committee for the Young Theorists' Forum in Durham.
Sep. 2012	Member of the organising committee for the BUSSTEPP summer school in Durham.

Coverage in Popular Press

Feb 2015	**New Scientist** article entitled 'Jostling photons could give dark matter away' based on PRL 114, 051303: *www.newscientist.com/article/mg22530092.800-jostling-photons-could-give-dark-matter-away.html*
	Space.com article on my work in PRL 114, 051303: *www.space.com/28489-dark-matter-light-halos.html*
	APS Physics synopsis entitled 'Dark Matter Not So Dark?' covering my work in PRL 114, 051303: *physics.aps.org/synopsis-for/10.1103/PhysRevLett.114.051303*
Aug 2014	**APS Physics** synopsis entitled 'Dark Matter or Neutrons?' covering my work in PRL 113, 081302: *physics.aps.org/synopsis-for/10.1103/PhysRevLett.113.081302*
July 2014	**Physics World** article on my work regarding the DAMA/LIBRA annual modulation from PRL 113, 081302: *physicsworld.com/cws/article/news/2014/jul/17/scattered-neutrons-could-mimic-dama-libras-dark-matter-modulation*
May 2014	**Guardian Science Blog** article on the reanalysis of CoGeNT data presented in JCAP 08(2014)014: *www.theguardian.com/science/life-and-physics/2014/may/11/dark-matter-and-drugs*