John Adams Institute

Philip Burrows, Director

John Adams Institute for Accelerator Science

Imperial College London

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Director's Report to Advisory Board

27/3/23

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Director's Report to Advisory Board

27/3/23

JAI Advisory Board

- Deepa Angal-Kalinin (ASTeC)
- Bill Barletta (ex-LBNL, MIT/UCLA)
- Oliver Bruning (CERN)
- Jonathan Dorfan (SLAC)
- Eckhard Elsen, Chair (ex-CERN, DESY)
- Christoph Quitmann (ex-MAXIV, Research Instruments)
- Akira Yamamoto (KEK, CERN)

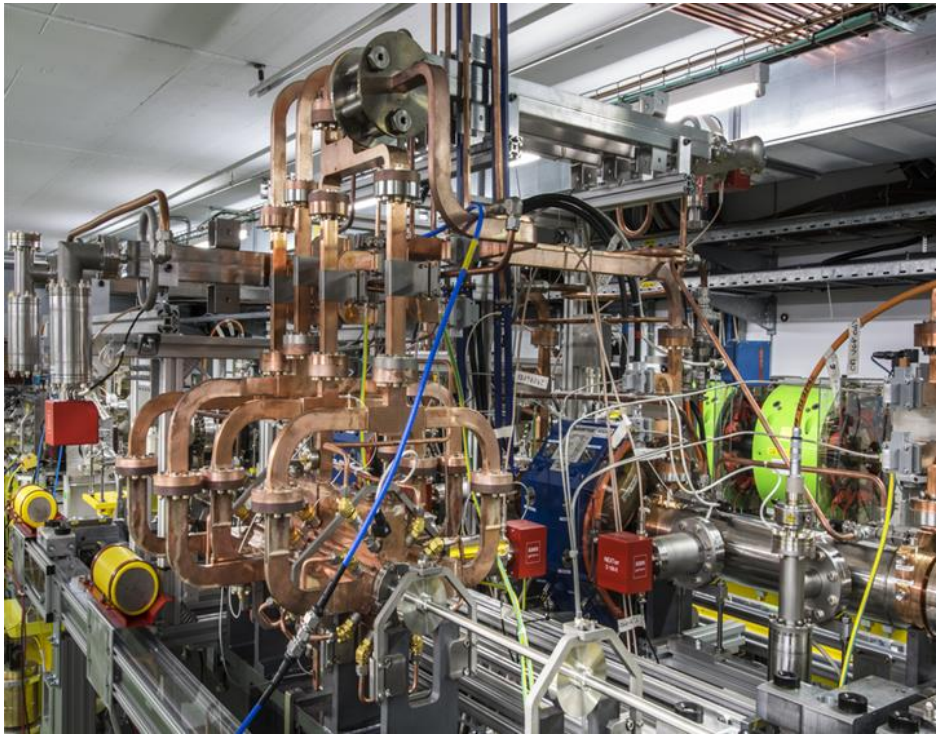
Thanks to:

- Andy Wolski (Cockcroft)
- Reinhard Brinkmann (DESY)

Outline

- JAI mission + overview
- Strategy
- Funding
- New opportunities
- Programme covered by the following speakers!

JAI Mission



A centre of excellence for advanced and novel accelerator technology:

provide expertise, research, development and training in accelerator techniques, and

promote advanced accelerator applications in science and society

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JAI Overview

One of two UK national academic centres of excellence in accelerator science & technology, set up in 2004

Oxford University, Royal Holloway, Imperial College

- **Research & development**
- **Education & training**
- **Knowledge exchange, impact, public engagement**

104 members:

- **22 faculty**
- **30 staff**
- **52 PhD students**
- **+ 33 affiliates (STFC labs, CERN …)**

JAI Research Strategy

- **World-class R&D at the cutting edge of accelerator science and technology**
  - **In collaboration with our UK and international partners**
- **Lead and support UK's strategic accelerator interests**
  - **Domestic and overseas accelerator facilities/programmes**
- **Capitalise on our strengths to make an impact**
- **Train next generation of accelerator scientists + engineers**
  - **Provide outstanding R&D opportunities on forefront projects**

Proactive and nimble in securing resources to support these ambitions

→ see later

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Diamond Light Source

Strong links in particular with Accelerator Physics, Diagnostics + Controls groups

PhD students (* = joint JAI/DLS):

Ji Li *	**(Oxford)**	**graduated 2021**
Dan Harryman	**(RHUL)**	**graduated 2021**
Niki Vitoratu *	**(RHUL)**	**graduated 2020**
Seb Wilkes *	**(Oxford)**	**started October 2021**
Alec Clapp *	**(RHUL)**	**started October 2021**
Corey Lehman *	**(Oxford)**	**starts October 2023**
Shaun Preston *	**(Oxford)**	**starts October 2023**

Joint PDRA (Oxford):

Maxim Korostelev	**2018-21**
Riyasat Husain	**started February 2023**

ISIS

Strong links with Intense Beams, Accelerator Physics and Operations groups

PhD students (Oxford):

Jake Flowerdew	IBEX Paul trap
Max Topp Mugglestone	beam dynamics
Rob Williamson	ISIS staff
David Posthuma de Boer	ISIS staff
Carl Jolly	ISIS staff (start PhD October 2023)

Joint PDRA (Oxford):

Emi Yamakawa	now ISIS staff
Hannah Wakeling	started March 2023

International

CERN

LHC, HL-LHC, AWAKE, Physics Beyond Colliders …

DESY

FLASHForward, LUXE …

KEK

Accelerator Test Facility (ATF/ATF2)

BNL

Accelerator Test Facility

SLAC

NLCTA, ESA test beam, FACET, FACET2

Key expertise (faculty + core staff)

John Adams Institute for Accelerator Science

Beam dynamics

Burrows, Pasternak, Pozimski, Sheehy, Tsesmelis

Beam instrumentation, feedback & control

Bett, Boorman, Burrows, Gibson, Karataev, Lyapin, Reichold

RF systems

Bett, Foster, Lyapin, Zhang

Metrology & alignment systems

Reichold

Laser + plasma systems

D'Arcy, Foster, Hooker, Mangles, Najmudin, Norreys, Rose, Walczak

Medical beamlines

Dosanjh, Long, Pasternak, Pozimski, Sheehy

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Accelerator R&D themes

Particle physics colliders and beamlines

Bett, Boorman, Burrows, Foster, Gibson, Karataev, Lyapin, Reichold, Zhang

Light sources

Burrows, Karataev, Lyapin

Intense hadron beams

Boorman, Gibson, Long, Pasternak, Pozimski, Sheehy

Advanced acceleration techniques

Burrows, D'Arcy, Foster, Hooker, Mangles, Norreys, Najmudin, Rose, Walczak

Societal applications

Dosanjh, Long, Najmudin, Pasternak, Pozimski, Reichold, Sheehy

Welcome!

Richard D’Arcy

Appointed Associate Professor at Oxford

Starts June 2023

Congratulations and au revoir!

Stewart Boogert

Director,
Cockcroft Institute
(Manchester)
from March 2023

Funding

Imperial College London

STFC core grant award

April 2021 – March 2025

£6.5M ‘resource’ + £0.6M equipment

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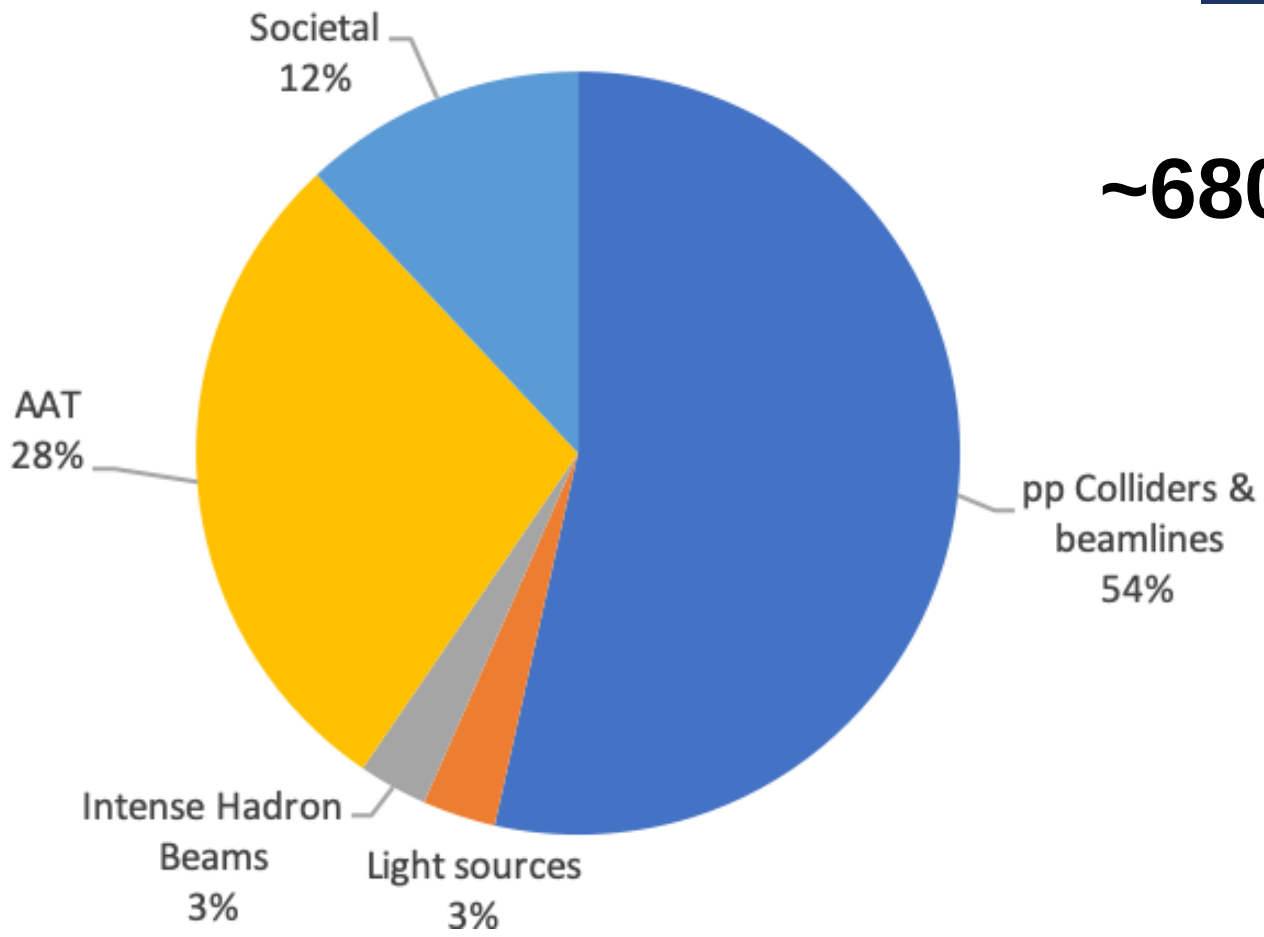
Staff distribution

(STFC core grant)



~680 staff months

(39 people)

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STFC core grant award

April 2021 – March 2025

£6.5M 'resource' + £0.6M equipment

Additional awards:

+ £170k equipment (2022)

+ £65k travel/consumables (2023)

+ 3 STFC quota PhD students annually → £300k/an

→ 4 in 2024

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PhD graduates (2022)

Laurence Wroe → CERN Fellow

Luke Dyks → CERN Fellow

Alexander von Boetticher → founded start-up company

Gian Luigi D'Alessandro → consultancy, Geneva

Theodorus Christodoulou → Cyprus

Helena Lefebvre → Prague

Daniel Harryman → UK industry

Siobhan Alden → viva in 2023

PhD graduates (2022)

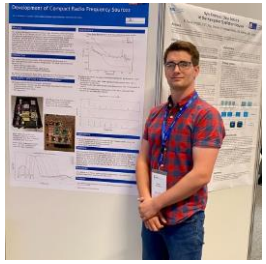
Robbie Watt → Research associate at SLAC / Stanford University

Cary Colgan → Tokamak Energy plc

Elias Gerstmayr → Research Associate QUB

Hin Tung Lau

Welcome class of 2022!

Alex Keykan		FASER
Max Bosman		EOBPM
Mark McCallum		RF design
Darren Chan		LWFA
Sasha Horney		LHC beam dynamics
Emily Howling		FCCee BPMs
Abigail James		AWAKE FDH
Sebastian Kalos		LWFA
Vlad Musat		ICS X-ray source
Jack Salvesen		FCCee IP feedback
Ginevra Casati		Injector LhARA
Rohan Kamath		Muon Collider
Ta Jen Kuo		ISIS/LhARA
Runfeng Luo		Radiation Plasma
Rehanah Razak		ISIS, LhARA







Congratulations!

Aimee Ross:

Poster Prize
EuroNNAc Special Topics Workshop,
Elba, Sept 2022

Alex Picksley:

Culham thesis prize

Additional grants/awards

since 2021

STFC:	HL-LHC-UK2, AWAKE-UK, MuHIG, students	£3.4M
European Commission:	I.FAST, FCC.IS, EAJADE, MuCol, EuPRAXIA-PP	£0.3M
CERN:	CLIC/CLEAR + 7 doctoral students	£1.0M
Diamond Light Source:	4 joint PhD studentships + PDRA	£0.5M
ISIS:	joint PDRA + students	£0.2M
EPSRC:	laser/plasma	£2.0M
ARCHER:	HPC	£0.1M
Oxford University:	kilohertz plasma accelerator (kPAC)	£0.1M
DSTL etc:	studentships	£0.1M
		£7.7M

+ UKRI Infrastructure Fund: ITRF

New opportunities

STFC is taking a new approach to funding accelerator science following the publication of the new Accelerator Strategic Framework:

- Community consortia are now invited to form and generate themed R&D programmes for a four-year programme of work that supports the development of UK strengths directly aligned with the Strategic Framework priorities, with an emphasis on exploiting existing facilities and the sustainable construction and operation of the UK's and CERN's priority infrastructures.
- STFC will support a few substantive (up to ~£1M/year) programmes. Outline programmes should be submitted in early 2023. These will be considered by STFC to ensure fit to the Accelerator Strategic Framework mission statement and themes, before inviting a subset to submit full proposals to be peer reviewed later that year.
- STFC aims to support work in up to three pillars:
  - LHC and its upgrades (including future machines), exploiting UK strengths aligned with the European Roadmap
  - Novel acceleration technologies (including exploiting CLARA, EPAC, and similar facilities)
  - The route to UK FEL capabilities

Funding for this call will start in April 2024 (with initial funding available from October 2023). The call is open to programmes that include industry partners.

New opportunities

JAI playing key roles in 4 proposals to the STFC R&D call:

Sustainable Engineering of Accelerator Systems (SEAS): Lancs, Liv, Oxford, Strath, STFC

WP4 (Burrows): systems engineering for sustainability: PDRA (£400k)

UK Muon Beams: 8 universities + STFC

WP2: muon cooling, WP4: towards a muon collider: PDRA + 3 students (£850k)

High-quality beams (H3beams): Lancs, Oxford, Manchester, Lpool, STFC

WP4 (Hooker): plasma stage, WP6 (D'Arcy): diagnostics (~£1M)

Coherent radiation sources (CRISP) (Najmudin): 6 universities + STFC

WP1 (Najmudin): mgmt, WP2 (Hooker): plasma accel + … (>£1M)

→ First-round selection ~ May 2023

JAI programme

today's presentations

Intense hadron beams	Rob Williamson
Light sources	Ian Martin
Particle physics colliders and beamlines	Stephen Gibson
Advanced acceleration techniques	Simon Hooker
Medical beamline applications:	
ITRF/LHARA	Will Shields
VHEE/FLASH/STELLA	Manjit Dosanjh
Commercialisation opportunities	Vishal Francis
Training and public engagagement	Emmanuel Tsesmelis
Design study: FCCee e+ injector	1st year students

Extra material

United Nations Office at Geneva

Working for Peace, Rights and Well-Being

International Affairs · Geneva · 103,573 followers

See all 667 employees on LinkedIn

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Most recent video

IWD 2023: Manjit Dosanjh

"If I could make my way here - coming from a village in India with no water and electricity – you can do it as well. Everything is possible."

Manjit Dosanjh is a project leader for STELLA (Smart Technologies to Extend Lives with Linear Accelerators) at CERN.

This month, we are celebrating women in science, tec ...see more

https://www.facebook.com/UN.Geneva/
https://www.instagram.com/p/CqLNS_qoKdV/
https://twitter.com/UNGeneva/status/1639297269135540224?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Etweet
https://www.linkedin.com/company/ungeneva/videos/

Congratulations!

Suzie Sheehy

→ Associate Professor
at Melbourne University

Appointed Visiting Lecturer
at Oxford

Emeriti

Brian Foster

Roman Walczak

Congratulations!

Philip Burrows

Elected Chair of the High-Luminosity LHC Collaboration Board

Appointed to CERN Scientific Policy Committee

Farewell!

Laurie Nevay

CERN staff,
Experimental Areas

Alberto Arteche

Maria Zambrina
Fellowship, Spain

George Hicks

Consultant
Comsol Mulitphysics

Welcome!

Hannah Wakeling

Sustainability of ISIS upgrade

Riyasat Husain

Diamond II

Welcome!

Jonathan Wood
Wakefield acceleration and radiation applications

Eva Los
Compton Scattering and High Field Physics

Michael Bloom
ELI technical development

Extra material

John Adams Institute for Accelerator Science

For reference if needed

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JAI faculty

Royal Holloway:

Stephen Gibson, Pavel Karataev

Imperial College:

Ken Long, Stuart Mangles, Zulfikar Najmudin, Jaroslav Pasternak,

Juergen Pozimski, Steven Rose

Emeritus: Bucker Dangor

Oxford:

Philip Burrows, Brian Foster, Simon Hooker, Peter Norreys, Armin Reichold, Roman Walczak

Visiting: Manjit Dosanjh, Suzie Sheehy, Emmanuel Tsesmelis, Richard Walker

Emeritus: George Doucas, Ken Peach

JAI staff

Imperial College:

Saleh Alatabi, Rory Baggott, Michael Bloom, Ben Chen, Ollie Ettlinger, Brendan Kettle, Rakesh Kumar Yembadi, Ajit Kurup, Eva Los, Jonathan Wood

Oxford:

Vittorio Bencini, Douglas Bett, Matthew Capstick, James Chappell, James Cowley, Linus Feder, Riyasat Husain, Pierre Korysko, Mark Jones, Jubin Mitra, Peter Qiu, Phill Tait, Weida Zhang

Royal Holloway:

Paul Bamford, Gary Boorman, Alessio Bosco, Richard Elsom, Alexey Lyapin, Mark McCallum, William Shields

JAI students

Oxford:

Emily Archer, Pablo Arrutia Sota, Joe Bateman, Darren Chan, Jake Flowerdew, Sasha Horney, Emily Howling, Abigail James, Sebastian Kalos, David McMahon, Vlad Musat, Carlo Mussolini, Collette Pakuza, David Posthuma de Boer, Cameron Robertson, Aimee Ross, Jack Salvesen, Bethany Spear, Max Topp-Mugglestone, Johannes Van de Wetering, Seb Wilkes, Robert Williamson, Wei Ting Wang, Laurence Wroe

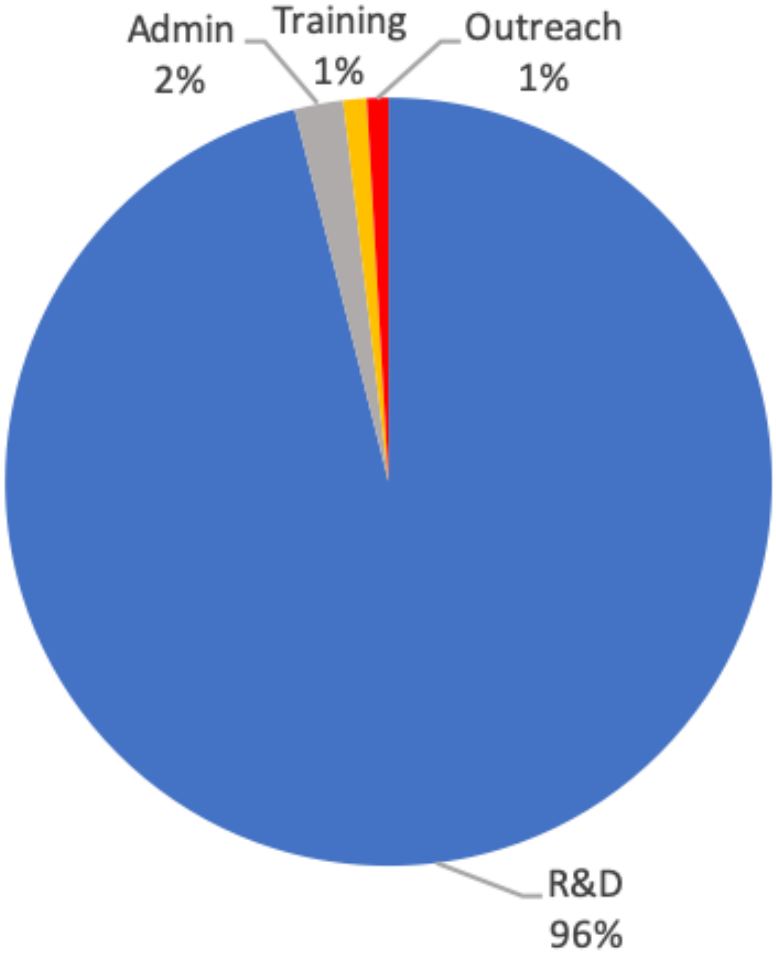
Imperial College:

Michael Backhouse, Meriame Berboucha, Ginevra Casati, Titus-Stefan Dascalu, Jan-Niclas Gruse, Anna Gunn, Adam Hughes, Paul Jurg, Rohan Kamath, Ta Jen Kuo, Eva Los, Runfeng Luo, Maria Maxouti, Rohan Prasad, Rehanah Razak, Rebecca Taylor, Wei Wu, Nuo Xu

Royal Holloway:

Siobhan Alden, Majid Ali, Max Bosman, Daniele Butti, Alec Clapp, Helene Guerin, Alex Keykan, Mark McCallum, Robert Murphy, Florian Stummer

Resource allocation



96% **R&D**

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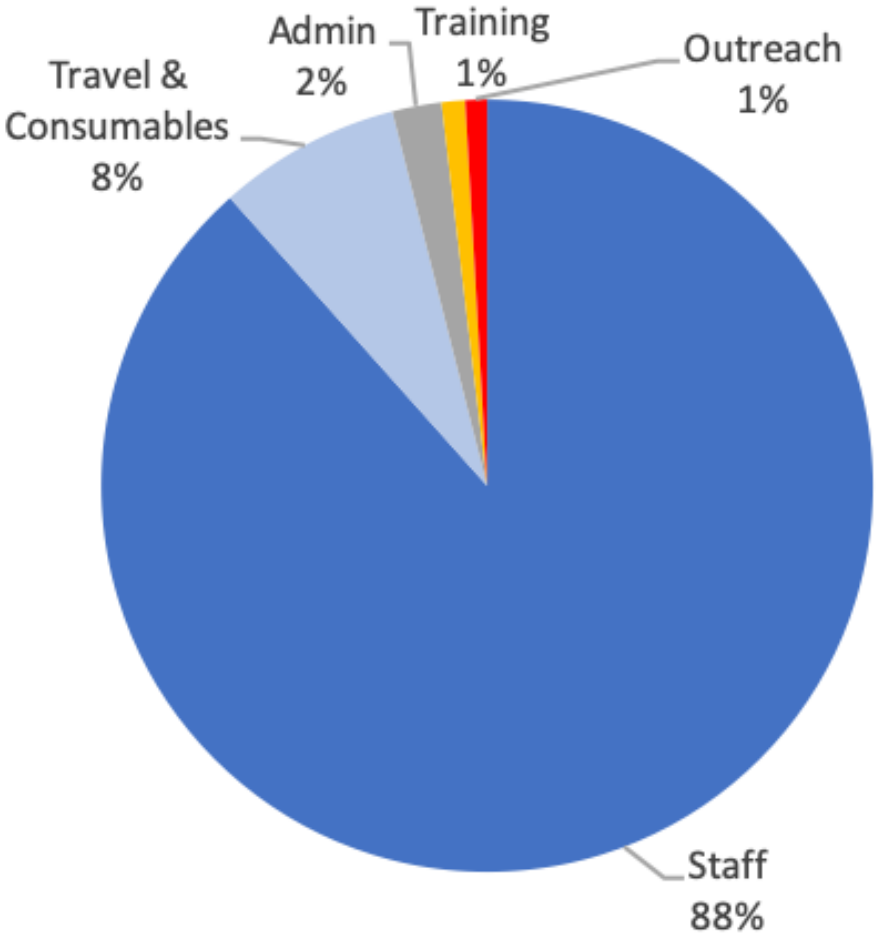
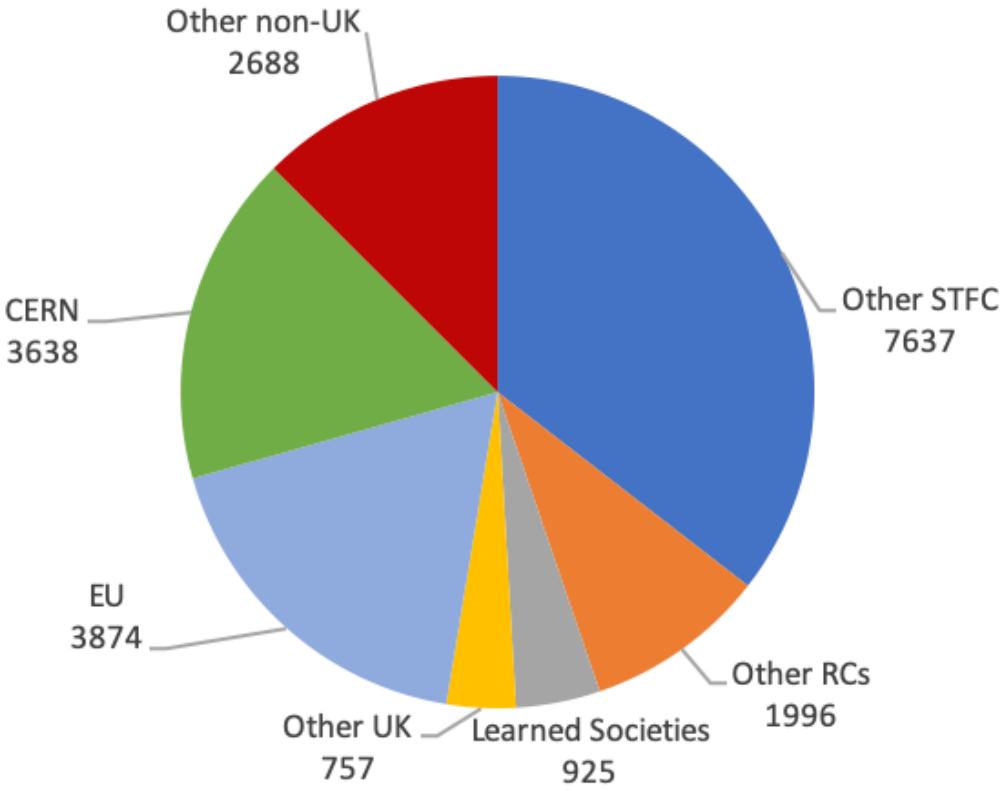
Resource allocation



88% **staff**

8% **T&C**

Leveraged resources

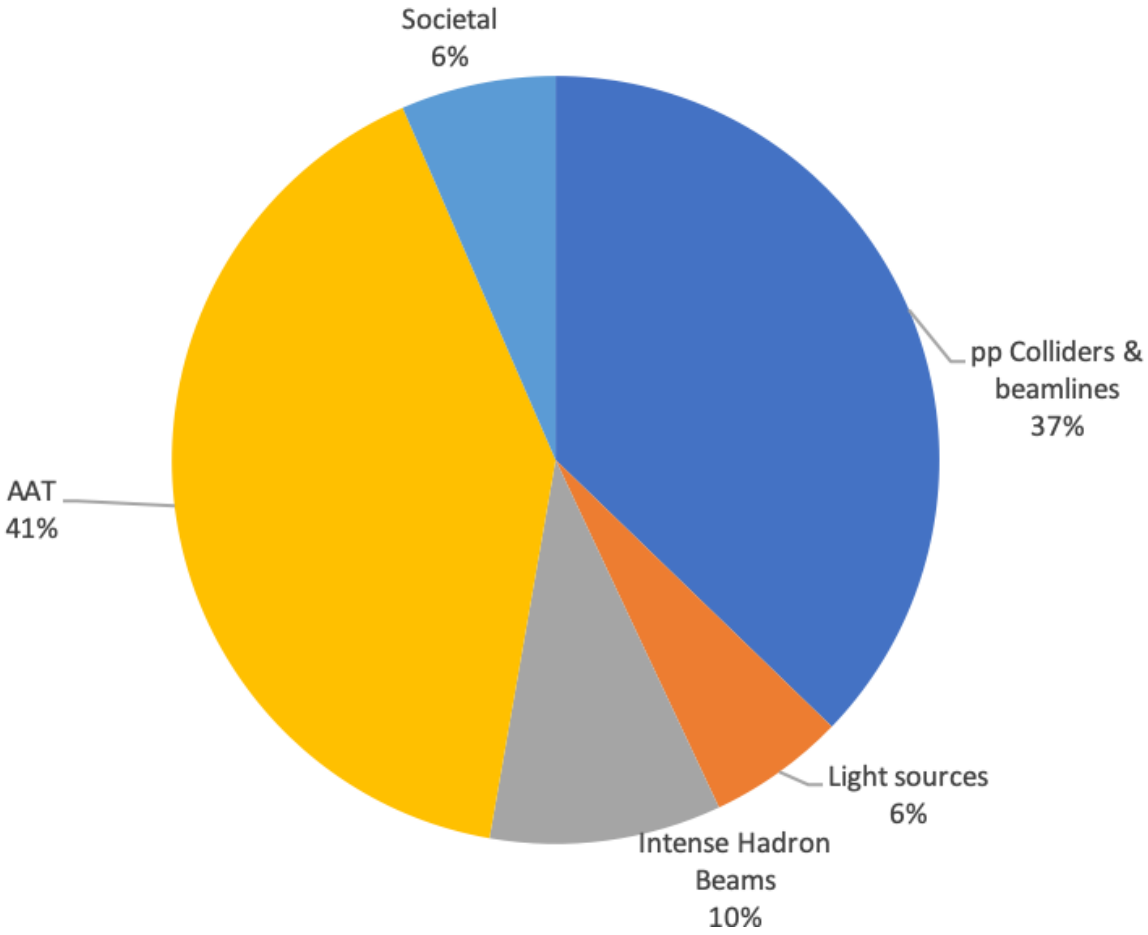


Breakdown of leveraged funding overlapping with grant period 2017-21 (£K)

Total: £26M
(includes £4.6M facilities access not shown)

Personnel distribution

(All funding sources)



Complete JAI personnel deployment
including students

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Strategic level - UK

- Cockcroft Institute:
  - Gibson on CI Scientific Advisory Committee
  - Angal-Kalinin on JAI Advisory Board
- ASTeC (Daresbury):
  - Burrows on ASTeC Advisory Board
- JAI, CI, ASTeC work together very closely in the UK project teams on:
  - ILC + CLIC, HL-LHC, AWAKE, UK FEL …
- Central Laser Facility (CLF) + Extreme Photonics Applications Centre (EPAC)

• STFC:	Najmudin	Science Board	(SB)
	Burrows	PP Technology Advisory Panel	(PPTAP)
	Long	Technology & Accelerator Advisory Board	(TAAB)
	Gibson	Projects Peer Review Panel	(PPRP)
• UKRI:	Foster	Infrastructure Advisory Committee	(IAC)
• UK:	Burrows	Physics Panel, Research Excellence Framework	(REF)

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EU Projects

Faculty provide scientific leadership + coordination in many EU projects

Previous:	**EUCARD 1 + 2**	
	TIARA	
	HiGRADE	
	EJADE	
	EuPRAXIA →	**on ESFRI roadmap**
	EuroCirCOL	
Ongoing:	**ARIES (2018-22)**	
	I.FAST (2021-25)	
Submitted:	**EAJADE**	
In preparation:	**Muon collider design study**	
	CREATE (Compact & Resource Efficient Accel. Technologies)	