



Second International Conference on Optical Angular Momentum

3 – 5 June 2013

The Burrell Collection, Glasgow, UK

icoam2013.iopconfs.org

Image: Light profile with modal contributions of 2, 0, 1 and 3 units of orbital angular momentum;
overlay of Rodin's The Thinker, as displayed at the Burrell Collection.



Second International Conference on Optical Angular Momentum

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Second International Conference on Optical Angular Momentum

Enquiries

General organisation

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Registration enquiries

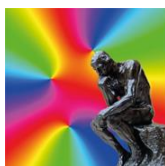
E-mail: conferences@iop.org
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Conference Chair

Dr Sonja Franke-Arnold
University of Glasgow, UK

Disclaimer

The Institute of Physics, the Burrell Collection and their approved representatives cannot take responsibility for any accident, loss or damage to participants or to their property during the conference.



Second International Conference on Optical Angular Momentum

Location

The conference will be held at the Burrell Collection in Pollok Country Park, Glasgow. The lectures will be held in the Lecture Theatre. The posters, refreshments and lunch will be held in Restaurant Conservatory.

(See appendix 1 for a location map)

Conference venue

The Burrell Collection
Pollok Country Park
2060 Pollokshaws Rd
Glasgow
G43 1AT

Tourist information

Glasgow is home to more than 20 world class museums and art galleries, including the iconic new Riverside Museum and the internationally renowned Kelvingrove Art Gallery & Museum. You can also experience the Art Nouveau genius of Glasgow born artist, architect and designer, Charles Rennie Mackintosh.

Glasgow is also a shopper's paradise - the city's Buchanan Street has recently been voted one of the world's top 10 shopping streets. Glasgow is home to shops to suit all styles from international high street stores to designer boutiques.

For more information visit www.seeglasgow.com

Travel to Glasgow

By air

Glasgow is served by 3 international airports with direct flights from 130 destinations worldwide.

GLASGOW INTERNATIONAL AIRPORT *(See appendix 2 for more information)*

Glasgow Airport is Scotland's long-haul gateway, with some 30 airlines serving around 90 destinations worldwide.

Glasgow Shuttle

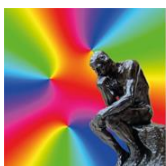
The 500 shuttle service, operated by First Bus, departs every 10 minutes from the front of terminal building and is available 24 hours a day. This direct journey into Glasgow takes around 25 minutes.

Glasgow Taxis

Taxis can be booked by calling +44 (0)141 429 7070 on arrival at the airport. Journeys into the city centre should take around 15-20 minutes and cost around £20.00

Glasgow Airport Taxis

Airport taxis are located immediately outside the terminal building. Journeys into the city centre should take around 15 - 20 minutes and cost around £22.00



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GLASGOW PRESTWICK AIRPORT

Glasgow Prestwick Airport is south west of the city and is a 45 minute direct train link from Glasgow City Centre.
Please refer to appendix 3 for more information on travel from Prestwick airport.

EDINBURGH INTERNATIONAL AIRPORT

Edinburgh International airport is approximately 1 hour from Glasgow.
Please refer to appendix 4 for more information on travel from Edinburgh to Glasgow.

Glasgow airport is only one hour's travel by air from London.

By rail

Glasgow is well connected by rail across the whole of the UK. Glasgow Central Station links Glasgow by rail to all UK cities. Glasgow Queen Street Station operates routes mainly to Central and Northern Scotland.

STATION	AVERAGE JOURNEY TIME
London	4 hours 10 minutes
Birmingham	4 hours
Manchester	3 hours 30 minutes
Liverpool	3 hours 40 minutes
Cardiff	6 hours 30 minutes
York	3 hours 30 minutes
Edinburgh	50 minutes

Virgin Trains

Virgin trains offer on-line booking, route maps, travel information and useful details on chosen destinations, as well as information about on-board services, passenger assistance and business travel.

National Rail Enquiries

National Rail Enquiries provides a searchable timetable and useful journey planner, as well as details on facilities at major UK stations and points of interest in the local area.

ScotRail

Scotland's Rail Operator gives you details on the West Highland Line, the North Highland Line and Caledonian Sleepers (overnight trains from Scotland to London). You will also find timetables, special ticket offers and other useful travel links.

By road

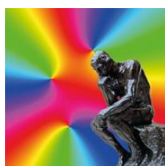
Scotland has an extensive motorway road network. Glasgow is linked to Edinburgh by the M8, England by the M74, Stirling by the M80 and the West Coast of Scotland by the M77.

The AA provides information about driving in the UK including maps, routes planners and travel insurance

Traffic Scotland provides up-to-date traffic and roadworks information.

Visas

Citizens of the EU do not need a visa to enter Britain. If you are from any other country, please find out about visa requirements before your travel by visiting the Home Office, UK Border Agency at www.ukvisas.gov.uk



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Travel between the Burrell Collection and Glasgow City Centre

By car

The Burrell Collection is around a 15 minute drive south west of Glasgow City Centre, in Pollok Country Park. There is pay and display parking on site. You can plan your journey with the AA at www.theaa.com.

By bus

First bus services 34, 45 and 57 runs from Glasgow city centre and stop on Pollokshaws Road, opposite the main entrance to Pollok Country Park. The journey takes around 20 minutes and it is approximately a 15 minute walk from the main park entrance to the Burrell Collection.

You can plan your journey with Traveline Scotland at www.travelinescotland.com.

By rail (See appendix 5 for the rail timetable)

Several trains depart Glasgow Central Station every hour on the Glasgow - East Kilbride line. The journey to Pollokshaws West station takes around 10 minutes.

The Burrell Collection is around a 10 – 15 minute walk from Pollokshaws West train station, through Pollok Country Park, with signposts along the way.

By taxi

A taxi journey from Glasgow City Centre to the Burrell Collection costs around £10.00 and should take about 15 minutes.

Local taxis

There is a free phone available for use at the Burrell Collection. For all other taxi needs you can book with Glasgow taxis on 0141 429 7070.

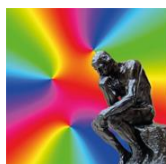
Registration

Registration will take place on Monday morning outside the Burrell Collection lecture theatre from 08.00.

Date	Time	Location
Monday 03 June	08.00 – 17.30	Burrell Collection lecture theatre
Tuesday 04 June	08.30 – 17.00	Burrell Collection lecture theatre
Wednesday 05 June	08.30 – 17.00	Burrell Collection lecture theatre

Please note that during lunch times the registration desk may be unmanned for a short period of time.

On arrival, each participant will receive a delegate pack containing a pen and pad, a programme and a lanyard badge as well as a copy of the abstract book. Please wear your badge at all times because this will help with security and enable you to identify your fellow delegates. Replacement badges can be issued at the registration desk.



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Venue facilities

The lecture theatre is situated on the ground floor of the Burrell Collection. Please note there is no internet access throughout the venue.

There is one lift for public use, and it is located opposite the stairs which lead down to the café and restaurant.

There are two sets of public toilets in the Burrell Collection. One is located as you enter the building, with the ladies on the right and gents on the left. Both toilets include an accessible toilet. The other set of toilets is in the café and restaurant area.

Catering

All catering is included in the registration fee and will take place at designated times throughout the conference programme. Refreshments, lunch and the reception will take place in the Conservatory Restaurant on the lower ground floor of the Burrell Collection. The conference dinner will take place at the National Piping Centre in central Glasgow.

Monday 03 June	Time	Location
Arrival refreshments	08:00 – 09:00	Burrell Collection Conservatory Restaurant
Mid-morning refreshments	10:30 – 11:00	Burrell Collection Conservatory Restaurant
Lunch	13:00 – 14:20	Burrell Collection Conservatory Restaurant
Mid-afternoon refreshments	15:30 – 16:00	Burrell Collection Conservatory Restaurant
Drinks reception	18:15 – 19:30	Burrell Collection Conservatory Restaurant
Finger buffet	19:30 – 20:00	Burrell Collection Conservatory Restaurant

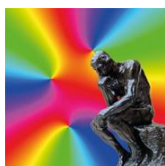
Tuesday 04 June	Time	Location
Mid-morning refreshments	10:30 – 11:10	Burrell Collection Conservatory Restaurant
Lunch	13:00 – 14:20	Burrell Collection Conservatory Restaurant
Mid-afternoon refreshments	15:50 – 16:20	Burrell Collection Conservatory Restaurant
Drinks reception	19:00 – 19:30	National Piping Centre
Conference dinner	19:30 – 22:30	National Piping Centre

Wednesday 04 June	Time	Location
Mid-morning refreshments	10:30 – 11:30	Burrell Collection Conservatory Restaurant
Lunch	13:00 – 14:20	Burrell Collection Conservatory Restaurant
Mid-afternoon refreshments	15:50 – 16:20	Burrell Collection Conservatory Restaurant

Dietary requirements

Participants with special dietary requirements are asked to notify the conference office by e-mail prior to their arrival if they have not already done so when registering. Those with special dietary requirements other than vegetarian are asked to make themselves known to the catering team. It will not be possible to provide an alternative menu unless prior notification has been received.

We are aware that nut allergies in particular present a serious problem to some people. The Burrell Collection can provide details of the ingredients of any particular dish, but cannot provide assurances that the food has not been cross contaminated with traces of nuts during ingredient processing at manufacturer's site or food during food preparation/service on site. For these reasons, we regret we are unable to provide guarantees that any of the food we serve is free from nuts or trace elements. Please e-mail kirsty.orr@iop.org if you have any queries.



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Social programme

Monday 03 June

A drinks reception will be held alongside the poster session from 18.00 on Monday evening. A buffet will also be provided. The reception will be opened with a welcome from a representative of the office of the Lord Provost of Glasgow.

Tuesday 04 June

The conference dinner will be held at the National Piping Centre in central Glasgow on Tuesday 04 June. There will be a drinks reception from 19.00 with a piper reception. A cash bar will also be available throughout the dinner.

National Piping Centre (*see appendix 6 for a location map*)

30-34 McPhater St

Glasgow G4 0HW

<http://www.thepipingcentre.co.uk/>

Wednesday 05 June

As part of the programme, there will be a guided tour of the Burrell Collection at 10:30 on Wednesday 05 June.

Presenter's information

An AV technician will be on site for the duration of the conference. The following AV equipment will be available in the lecture theatre throughout the conference.

- Laptop
- Data projector
- Lectern
- Lapel microphone
- Handheld microphone

Powerpoint presentations in 4:3 ratio are preferable. Please ensure you arrive in time to get your presentation loaded. Presenters are requested to bring their presentations on a USB memory stick and preload them onto the PC in the lecture theatre.

Posters

Posters will be on display in the area between the lecture theatre and the conservatory restaurant. Poster boards and fixing material will be provided. Please place posters on the poster board number that matches your allocated number in the programme. Posters must not be larger than A0 in size, in portrait format and therefore if your poster does not fit within these dimensions, we cannot guarantee it will be displayed.

Posters should be mounted between 15:30 and 18:00 on Monday 03 June and must be removed by 10:00 on Tuesday 04 June. Although organisers will endeavour to save poster material, no guarantee can be made for posters not removed by 10:00 on Tuesday 04 June.



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Safety and security

Personal property

The Burrell Collection and the Institute of Physics do not accept responsibility for the loss of or damage to personal property. Visitors are advised to keep personal possessions with them.

Evacuation policy

The procedure on hearing the fire alarm, or on discovering a fire, as shown on the Fire Action Notice, is to vacate the building by the quickest and safest route, and report to the assembly point. The assembly point is the cobbled area opposite the main entrance. Residents should never use fire safety equipment to fight the fire - it is installed for use by members of the fire service. Guests and staff should not re-enter the building until the Fire Service or Security team confirms that it is safe to do so.

First aid

If first aid is required during the conference please notify the conference organisers, who will alert the first aider on site. A first aid room is available and is located next to the restaurant.

Smoking

In accordance with government legislation smoking is not permitted in any building.

Behaviour and conduct

The Institute of Physics and The Burrell Collection reserve the right to charge in full for any loss or damage.



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Oral programme

All talks are invited

Monday 3 June 2013

08:00 Registration and refreshments

09:10 Welcome and Introduction

Session 1: OAM phenomenology

Chair: S Barnett, University of Strathclyde, UK

09:20 **(session introduction) Analogies between wave optics and quantum mechanics**
G Nienhuis, Universiteit Leiden, Netherlands

09:50 **What is spin to orbit angular momentum transfer?**
I Fernandez-Corbaton, Macquarie University, Australia

10:10 **Singular phase structure of nano-antenna system**
M Coles, University of East Anglia, UK

10:30 Refreshments

11:00 **Optical angular momentum and symmetries**
R Cameron, University of Strathclyde, UK

11:20 **Chiral electromagnetic fields**
E Hendry, University of Exeter, UK

11:40 **Five momenta**
M Berry, University of Bristol, UK

12:00 Poster mini talks

13:00 Lunch

Session 2: Vortices in optical, electron and matter waves

Chair: D Andrews, University of East Anglia, UK

14:20 **(session introduction) Peculiar rotation of electron vortices in magnetic fields**
P Schattschneider, University Service Centre for Electron Microscopy, Austria

14:50 **Generation and detection of OAM in electron beams**
J Verbeeck, University of Antwerp, Belgium

15:10 **Manipulation and detection of OAM in electron vortex beams**
B McMorran, University of Oregon, USA

15:30 Refreshments



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- 16:00 **Controlling the handedness of laser resonators**
A Forbes, National Laser Centre, South Africa
- 16:20 **The physics of conserved quantities in classical electrodynamics**
B Thide, Swedish Institute of Space Physics, Sweden
- 16:40 **Radio applications of OAM states**
F Tamburini, University of Padova, Italy
- 17:00 Poster mini talks
- 18:00 Drinks reception
- 18:30 Poster session part 1
- 19:45 Finger buffet
- 20:30 Poster session part 2

Tuesday 4 June 2013

- 08.30 Registration

Session 3: OAM toolbox (Phorbitech)

Chair: M Padgett, University of Glasgow, UK



- 09:00 **(session introduction) Spiral photolithography of azopolymers**
L Marrucci, Università di Napoli Federico II, Italy
- 09:30 **Complete experimental toolbox for alignment-free quantum communication**
F Sciarrino, Sapienza Università di Roma, Italy
- 09:50 **Integrated vortex beam emitters**
S Yu, University of Bristol, UK
- 10:10 **'Twisted' photon entanglement**
W Löffler, Leiden University, Netherlands
- 10:30 Refreshments
- 11:10 **Dimensionality in orbital angular momentum entanglement**
M J Romero, University of Glasgow, UK
- 11:30 **Biphoton optical vortices**
S Walborn, Universidade Federal do Rio de Janeiro, Brazil
- 11:50 **Quantum nature of radial degree of freedom of paraxial waves**
E Karimi, University of Ottawa, Canada
- 12:10 **High density atom traps using holographically shaped beams**
N Radwell, University of Glasgow, UK
- 12:30 **Experimental instability of higher-order optical vortices**
M van Exter, Leiden University, Netherlands
- 13:00 Lunch



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Session 4: Vector vortex beams and spin-orbit interactions of light

Chair: F Sciarrino, University of Rome, Italy

- 14:20 **(session introduction) Transverse spin and momentum in evanescent waves**
K Bliokh, RIKEN, Japan
- 14:50 **Vector beams**
G Milione, City College of New York, USA
- 15:10 **Polarization patterns and singularities of Poincare beams**
E J Galvez, Colgate University, USA
- 15:30 **Optical and matter vortices and interactions**
M Babiker, University of York, UK
- 15:50 Refreshments
- 16:20 **Singularimetry and topological aberrations**
J Götze, Max-Planck-Institute for the Physics of Complex Systems, Germany
- 16:40 **Imprinting skyrmion spin textures in spinor Bose-Einstein condensates**
Y Shin, Seoul National University, South Korea
- 17:00 **Exploiting the angular momentum of light in nanophotonics**
G Molina-Terriza, Macquarie University, Australia
- 18:00 Coaches depart from the Burrell Collection
- 18:30 Drinks reception and conference dinner (National Piping Centre)

Wednesday 5 June 2013

- 08:30 Registration

Session 5: OAM applications in imaging

Chair: B Boyd, University of Ottawa, Canada and University of Rochester, USA

- 09:00 **(session introduction) Using OAM light for optical imaging**
M Ritsch-Marte, Innsbruck Medical University, Austria
- 09:30 **Quantitative spiral phase contrast imaging in a stimulated emission depletion microscope**
M Guillon, Centre National de la Recherche Scientifique, France
- 09:50 **On the generation and analysis of wave vortices**
K Volke-Sepúlveda, Universidad Nacional Autónoma de México, México
- 10:10 **Storage and non-collinear retrieval of optical angular momentum of light in cold atoms**
L Pruvost, Centre National de la Recherche Scientifique, France
- 10:30 Refreshments and guided tour of the Burrell Collection



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Session 6: OAM matter interaction

Chair: S Franke-Arnold, University of Glasgow, UK

- 11:30 **(session introduction) Vortex beams and angular momentum of light**
H Rubinsztein-Dunlop, University of Queensland, Australia
- 12:00 **Structured light fields based on spiral beams – promoting photonic lattices and optical micromanipulation**
C Denz, University of Münster, Germany
- 12:20 **Twisted light in nanostructures**
N M Litchinitser, The State University of New York, USA
- 12:40 **Topological shaping of light by structured thin metal films**
E Brasselet, Centre National de la Recherche Scientifique and University of Bordeaux, France
- 13:00 Lunch

Session 7: OAM applications in quantum information

Chair: L Marrucci, University of Naples, Italy

- 14:20 **(session introduction) The Poincare sphere for OAM: variations on a theme**
M Dennis, University of Bristol, UK
- 14:50 **The duality relationship in the presence of post-selection**
J Leach, Heriot-Watt University, UK
- 15:10 **Playing with quantum states, playing with dimensions**
J P Torres, Institut de Ciències Fotoniques, Spain
- 15:30 **Visualizing quantum state rotations through weak measurements of orbital angular momentum**
M Malik, University of Rochester, USA
- 15:50 Refreshments
- 16:20 **Real-time imaging of quantum entanglement**
R Fickler, University of Vienna, Austria
- 16:40 **More twists on optical twistors: of helicon-conical beams, superpositions and combinations**
D Z Palima, Technical University of Denmark, Denmark
- 17:00 Close



Poster programme

Topic: OAM phenomenology

- P.01 **Experimental study of the cross-correlation function for partially coherent Laguerre-Gaussian beams**
A Mourka, University of St. Andrews, UK
- P.02 **Optical angular momentum in conical diffraction**
R Darcy, Trinity College Dublin, Ireland
- P.03 **Clebsch-Gordan coefficients for the addition of orbital angular momentum of Gaussian modes**
M Dennis, Bristol University, UK
- P.04 **The role of vortices in the generation of optical lift (withdrawn)**
- P.05 **Modal characterisation using principal component analysis: application to Laguerre-Gaussian beams and their superposition**
A Mourka, University of St Andrews, UK
- P.06 **The forgotten quantum number: radial modes of Laguerre-Gauss beams**
W Plick, Institute for Quantum Optics and Quantum Information, Austria
- P.07 **Do waves carrying orbital angular momentum possess azimuthal linear momentum?**
F Speirits, University of Strathclyde, UK

Topic: Vortices in optical, electron and matter waves

- P.08 **Electron vortex propagation in magnetic fields**
C Greenshields, University of Glasgow, UK
- P.09 **Chiral specific electron vortex beam spectroscopy**
S Lloyd, University of York, UK
- P.10 **Subwavelength control of orbital angular momentum of light**
G Parisi, Padova University and Laboratory of Nanofabrication of Nanodevices, Italy
- P.11 **Electron diffraction catastrophies**
T C Petersen, Monash University, Australia
- P.12 **Instability of higher-order optical vortices**
F Ricci, University of Padova, Italy
- P.13 **Experimental study of nanomanipulation of nanoparticles using electron vortex beams**
J Yuan, University of York, UK
- P.14 **Angular momentum-dependent helicity transfer in nano-apertures**
X Zambrana-Puyalto, Macquarie University, Australia

Topic: OAM toolbox (Phorbitech)

- P.15 **Photonic qudits and their applications in fundamental quantum mechanics and quantum information**
V D'Ambrosio, Sapienza Università di Roma, Italy
- P.16 **Simulation of a spin polarization device in an electron microscope**
V Grillo, S3-NANO CNR, Italy



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- P.17 **Detection of a spinning object using light's orbital angular momentum**
M Lavery, University of Glasgow, UK
- P.18 **Nonlinear interpolation of OAM enhanced beam shifts**
A Nugrowati, Leiden University, Netherlands
- P.19 **Method for direct measurements of the mean and variance of light OAM**
B Piccirillo, Università degli Studi di Napoli, Italy
- P.20 **3D fluorescence imaging of laser beams**
N Radwell, University of Glasgow, UK
- P.21 **Transverse Doppler Effect using optical beams with a twist**
C Rosales-Guzmán, ICFO-Institut de Ciències Fotoniques, Spain
- P.22 **Photoalignment-based liquid crystal q-plate technology**
S Slussarenko, Università degli Studi di Napoli "Federico II", Italy
- P.23 **Joining the quantum state of two photons into one**
N Spagnolo, Sapienza Università di Roma, Italy

Topic: Vector vortex beams and spin-orbit interactions of light

- P.24 **Controlled acceleration of superimposed higher-order Bessel beams**
A Dudley, Council for Scientific and Industrial Research National Laser Centre, South Africa
- P.25 **Measuring Poynting vector of optical vortices using polarization interference**
G Milione, City College of New York, USA
- P.26 **Optical angular momentum and phase conjugation (withdrawn)**
- P.27 **Topology of dark tangles in light**
A Taylor, University of Bristol, UK
- P.28 **Spatial correlation singularities of partially coherent fields**
Y Yang, University of Electronic Science and Technology of China, China

Topic: OAM applications in imaging

- P.29 **Ince-Gaussian beams: manifold perspective in optical tweezers**
C Alpmann, University of Münster and Institute of Applied Physics, Germany
- P.30 **Heralded single-photon ghost imaging utilising EPR correlations**
R Aspden, University of Glasgow, UK
- P.31 **3D computational imaging via correlation measurement**
B Sun, University of Glasgow, UK
- P.32 **Sub-Rayleigh optical vortex coronagraphy**
E Mari, University of Padova, Italy
- P.33 **Optimising the use of detector arrays for measuring intensity correlations of photon pairs**
D Tasca, University of Glasgow, UK



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Topic: OAM matter interaction

- P.34 **Propagation of high-intensive femtosecond vortex beams in media with focusing and inertial defocusing nonlinearities**
O Fedotova, Belarus National Academy of Sciences, Belarus
- P.35 **Duality and beams of well-defined helicity: how to use them for experimental purposes**
I Fernandez-Corbaton, Macquarie University and 2 ARC Center of Excellence for Engineered Quantum Systems, Australia
- P.36 **Light-matter angular momentum exchange in nanophotonic structures: beyond “spin” and “orbital” angular momentum**
R Oulton, Bristol University, UK
- P.37 **Highly collimated source of cold Rb atoms from a 2-dimensional magneto-optical trap**
L Pruvost, Centre National de la Recherche Scientifique, France
- P.38 **Classical and quantum regimes of collective orbital angular momentum exchange between light and ultracold atoms**
G Robb, University of Strathclyde, SUPA, UK

Topic: OAM applications in quantum information

- P.39 **Fractional quantisation of optical angular momentum**
K Ballantine, Trinity College Dublin, Ireland
- P.40 **Efficient quantum state reconstruction with mutually unbiased bases in high-dimensional orbital angular momentum subspaces**
D Giovannini, University of Glasgow, UK
- P.41 **Imaging high-dimensional spatial entanglement with a camera**
M Edgar, University of Glasgow, UK
- P.42 **Entanglement in 100 dimensions**
M Krenn, University of Vienna, Austria
- P.43 **Gaussian entropy minimising states for orbital angular momentum and angular position**
A Yao, University of Strathclyde, UK



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Sponsors

PHORBITECH

www.phorbitech.eu



PHORBITECH is a European project funded under the FET-Open Programme within the 7FP Programme involving 6 European and 1 extra-European partners. PHORBITECH is working on the development of an optical toolbox of highly innovative optical components and devices for the full control of orbital angular momentum, including its generation, manipulation, transmission and detection.

The results will have future applications in quantum information technology, high density optical data storage, and materials probing. orbital angular momentum (OAM) is a degree of freedom of light associated with rotationally structured transverse spatial modes of light beams, as in helical wave-front beams. in many respects, oam is analogous to polarization, but in contrast to polarization it is defined in an unbounded infinite-dimensional space.

SUPA

www.supa.ac.uk



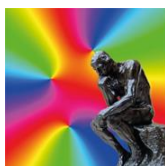
SUPA is a pooling of physics research and post-graduate education in 8 Scottish universities: Aberdeen, Dundee, Edinburgh, Glasgow, Heriot-Watt, St Andrews, Strathclyde and West of Scotland.

Boulder Nonlinear Systems, Inc.

www.bnonlinear.com



Boulder Nonlinear Systems (BNS) designs, manufactures, and sells standard and custom light control solutions. Spatial Light Modulators, Polarization Rotators and Optical Shutters are offered for beam forming, beam steering, biotechnology, microscopy, military/civil defense, phase/polarization control, pulse shaping, wavefront analysis/testing, and other applications.



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The RSC is the largest organisation in Europe for advancing the chemical sciences. Supported by a worldwide network of members and an international publishing business, our activities span education, conferences, science policy and the promotion of chemistry to the public.

European Physical Society

www.eps.org



The European Physical Society (EPS) is a not for profit association whose members include 41 National Physical Societies in Europe, individuals from all fields of physics, and European research institutions.

As a learned society, the EPS engages in activities that strengthen ties among the physicists in Europe. As a federation of National Physical Societies, the EPS studies issues of concern to all European countries relating to physics research, science policy and education.

Institute of Physics

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