The SUPA Team 2019

CEO & Director of Graduate School:

Prof Alan Miller (0.5FTE): alan.miller@supa.ac.uk

Graduate School Coordinators:

Dr Karen Ness (0.5FTE): karen.ness@supa.ac.uk (seconded to Leverage Grant 6mo.)

Dr Vicky Ingram (0.5FTE): vicky.ingram@supa.ac.uk

Dr Linda Hadfield (0.5FTE): linda.hadfield@supa.ac.uk (6mo.)

E-Learning Technologist:

Sean Farrell (0.5FTE) s.j.farrell@hw.ac.uk

Admin Support Team:

Jamie McIntyre (1.0FTE), Marjory Walker (0.6FTE), Jean Greig (10 days/mo.)

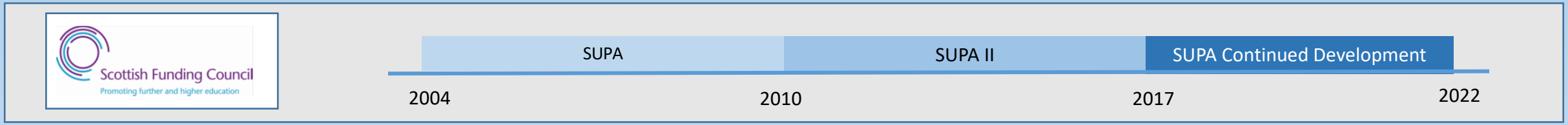
supacentral@glasgow.ac.uk

@physicsscotland

Web: www.supa.ac.uk/

SUPA Newsletter: www.supa.ac.uk/newsletter

SUPA Launched in 2004



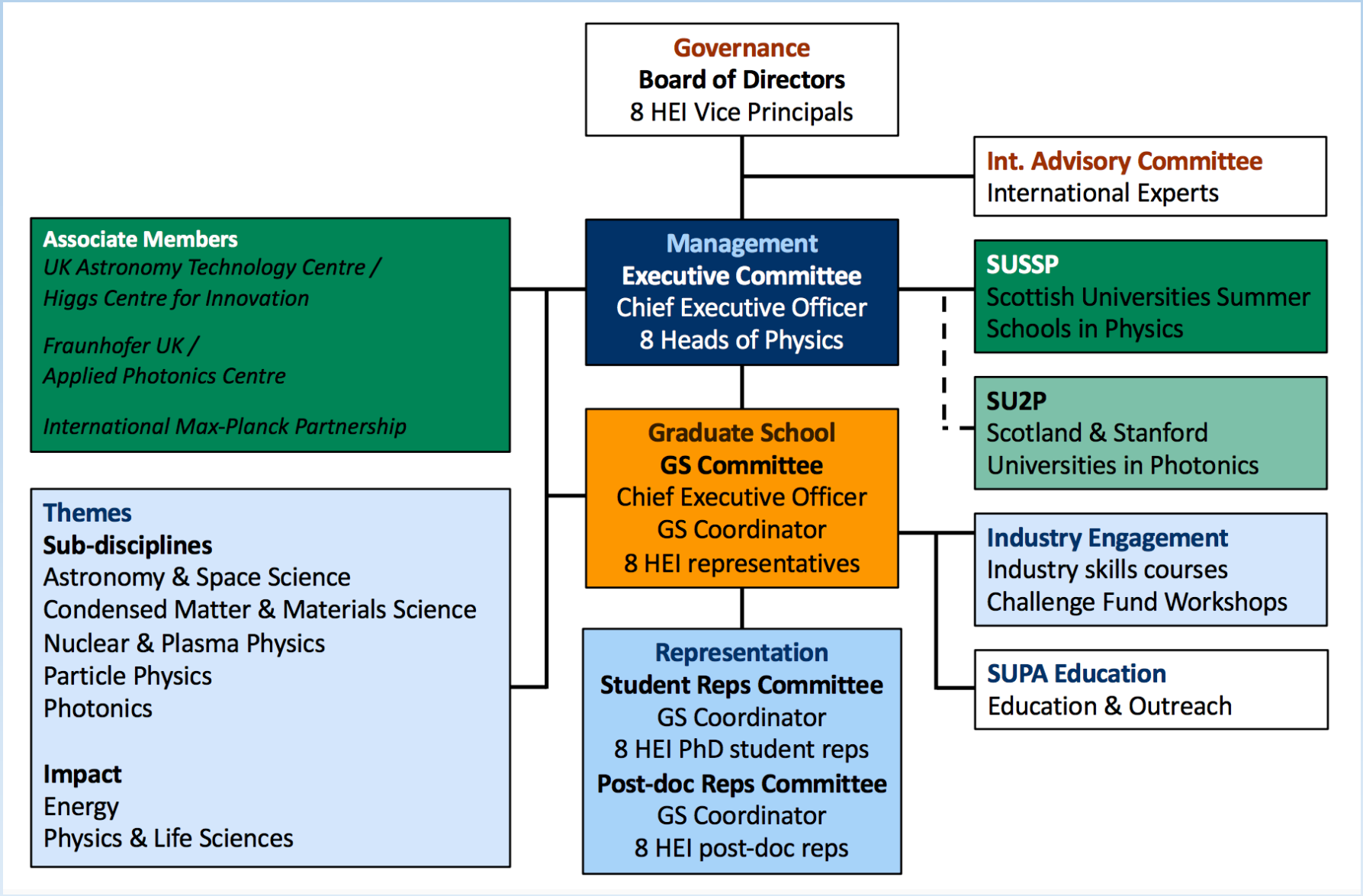
SUPA Strategic Objectives, 2017-22:

- a Scottish physics research base that is internationally competitive and improving its reputation in the world,
- access to an excellent learning experience and support for students and early career researchers,
- value created for the Scottish economy and society.

Graduate School Welcome to new PhD Students

(St Andrews, Oct 2018)

Structure


Governance
Board of Directors
8 HEI Vice Principals
Int. Advisory Committee
International Experts
Associate Members
UK Astronomy Technology Centre / Higgs Centre for Innovation
Fraunhofer UK / Applied Photonics Centre
International Max-Planck Partnership
Management
Executive Committee
Chief Executive Officer
8 Heads of Physics
SUSSP
Scottish Universities Summer Schools in Physics
SU2P
Scotland & Stanford Universities in Photonics
Graduate School
GS Committee
Chief Executive Officer
GS Coordinator
8 HEI representatives
Industry Engagement
Industry skills courses
Challenge Fund Workshops
Themes
Sub-disciplines
Astronomy & Space Science
Condensed Matter & Materials Science
Nuclear & Plasma Physics
Particle Physics
Photonics
Impact
Energy
Physics & Life Sciences
Representation
Student Reps Committee
GS Coordinator
8 HEI PhD student reps
Post-doc Reps Committee
GS Coordinator
8 HEI post-doc reps
SUPA Education
Education & Outreach

SUPA in 2019

- Beyond Scotland –> NPL, U.Newcastle
- Scottish Universities Summer Schools in Physics (SUSSP)
- Cross-Pool collaboration
- Funding Landscape -> Challenge Funds, etc.
- CDT's
- Industry -> UK Fraunhofer, Technology Scotland, ATC, …
- SFC Review of Research Pooling
- What next for research pooling?
- International reach -> US, Europe, China?

Scottish Universities Summer Schools in Physics (SUSSP)

- established 1960 by the 4 “ancients”

“to contribute to the dissemination of advanced knowledge and the formation of contacts among scientists from different countries”

- Schools at PhD level of the highest international standing
- 1 to 2 weeks in duration including a social programme
- Top researchers from around the world provide 3 or 4 lecturers each
- Typically 60 to 100 research students and PDRAs
- >50% of ‘students’ from abroad

SUSSP73: Gravitational Wave Astronomy (2017)
SUSSP74: Innovation and Entrepreneurship in Photonics (2018)
SUSSP75: Nuclear Physics (2019)

Pooling Review Advisory Panel Membership

Chair:

Prof Louise Heathwaite, Lancaster University

Dr Cat Ball, Policy Manager, Association of Medical Research Charities.

Dr Alicia Greated, Director of Research & Enterprise at HWU, member of SFC's RKEC.

Douglas Mundie, Deputy Chair of SFC's Board and member of SFC's RKEC.

Prof Philip Nelson, Prof Acoustics, U. Southampton, formerly Executive Chair, EPSRC.

Dr John Rees, Director of Science (Earth Hazards, Observatories), British Geological Society and GCRF Challenge Leader, UKRI.

David Sweeney, Executive Chair, Research England, UK Research and Innovation.

Prof James Wilsdon, Prof of Research Policy and Director of Research and Innovation, Faculty of Social Sciences, U. Sheffield.

SUPA Meeting with Chinese Academy of Sciences

Tues 28th May 2019

SUPA Physics Scotland

Scottish Universities Physics Alliance

Discussion Meeting between
Chinese Academy of Sciences (CAS) &
Scottish Universities Physics Alliance (SUPA)
28th May 2019
University of Edinburgh, Edinburgh Centre for Carbon Innovation (ECCI)

Programme:

10.00 Welcome delegation – coffee/tea

Welcome to the University of Edinburgh - Principal Peter Mathieson

Welcome from SUPA CEO (incl. 6 min APS SUPA video)

Topics:

SUPA Partner Institutions & Associate Members

Scottish Funding Council (SFC) "Research Pooling" initiative

SUPA structure, management, operation, facilities and relationships

International agenda - examples of current SUPA research collaborations with China:

- Dynamical Systems & Quantum Chaos
- Astro & Particle Physics
- Photonics - Derryck Reid
- Condensed Matter & Materials - Andreas Herman

Advanced Training via the SUPA multi-institution Graduate School

Multi-University Centre for Doctoral Training in Applied Photonics – Derryck Reid

CAS presentation (optional)

Discussion: Opportunities for developing future collaborations between Scotland and CAS.

12.00 Departure

University of Aberdeen · University of Dundee · The University of Edinburgh · University of Glasgow · Heriot-Watt University · University of St Andrews · University of Strathclyde Glasgow · University of the West of Scotland UWS

- Welcome from Prof Peter Mathieson, Principal, U.Edinburgh
- 24 delegates from Chinese Academy of Sciences

  -> physical, life, computational, environmental sciences
- Scottish Physics has a large number of collaborations with China
- Encouraging discussions about opportunities to expand collaboration
- Formal link between SUPA and Institute of Physics / CAS

Collaborations: Dynamics and Chaos Theory

- Collaborations with over 30 Chinese Universities.
- 6 honorary titles from Chinese Universities.
- Organising two international conferences in dynamics to be held in Xi'an.
- Co-Founder and Co-Director of the Aberdeen-Lanzhou-Tempe Joint Research Centre at Lanzhou University.
  - New field of relativistic quantum chaos
- Published 12 to 14 papers with Chinese collaborators last year.
- Initiated a number of MoUs between Chinese Universities and U.Aberdeen.
- Initiating two-plus-two undergraduate programmes between Aberdeen and Chinese Universities.

Prof Celso Grebogi

UNIVERSITY OF ABERDEEN

Collaborations: Astrophysics

			U. St Andrews
Galaxy Surveys	Prof Yanmei Chen	**Nanjing University**	Dr Vivienne Wild
Active Galactic Nuclei	Prof Jian-Min Wang	**CAS Institute for High Energy Physics**	Prof Keith Horne
Star Formation	Dr Gregory Herczeg	**Peking University**	Dr Aleks Scholz
Exoplanets	Prof Shude Mao	**Tsinghua University**	Dr Martin Dominik

Gravitational-Wave Excellence through Alliance Training (GrEAT) Network (UK – China)	**Tsinghua University** **Sun Yat-sen University** **Shandong University** **Huazhong University of S&T** **Tongji University** **Beijing Normal University**	**U. Glasgow,** **U. Strathclyde** **& UWS**
Space-borne Gravitational Wave Detector	**Sun Yat Sen University &** **Chinese Academy of Science**	**U. Glasgow**

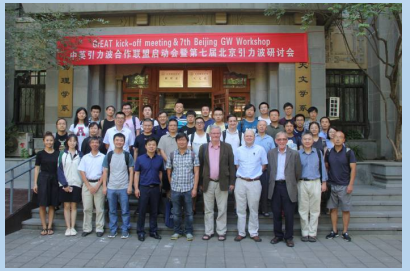
Prof. Ik Siong Heng

Square Kilometre Array (SKA)	**National Astronomical Observatories of the Chinese Academy of Sciences (NAOC) & Chinese Ministry of S&T (MOST)**	**U. Edinburgh & UKATC**

GrEAT Network with China

The Gravitational-wave Excellence through Alliance Training (GrEAT) Network with China is an STFC funded network which aims to build links between UK-China based on gravitational wave research so as to strengthen capacity for gravitational wave research in China.

GrEAT Network with China



The network brings together several Chinese and UK universities to address challenges described as follows.

Aims

1. Identify potential industrial and commercial partners in China for GW technology and expertise exploitation.
2. Provide high-quality training for early-career researchers on the planning and delivery of outreach on gravitational-wave astronomy.
3. Provide training on data analysis and numerical modelling that will have applications to gravitational wave research and beyond.
4. Build the necessary skill base to develop/fabricate/install and innovate future detector technologies.
5. Support PhD students and early career researchers from Chinese institutions working on space GW detectors to train in the UK.

Collaborations: Particle Physics

Professor Lars Eklund
University of Glasgow

- Visiting scientist under the ‘CAS President’s International Fellowship Initiative’
- 11 weeks at the University of Chinese Academy of Sciences (UCAS), Beijing.

UCAS and U. Glasgow partners at CERN searching for and measuring the properties of doubly-charmed baryons.

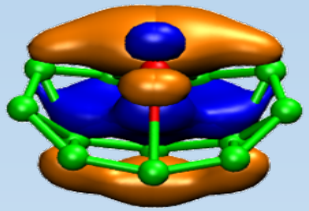
Lars gave seminars, lectured at a summer school, taught a lab for post-graduate students, and attended workshops.

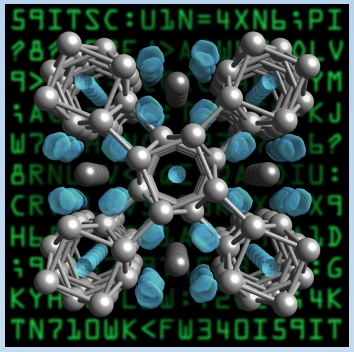
Engaged in the developments towards the CepC, the 100 km long circular collider that may be built in China in the next decade - signatory of the conceptual design report.

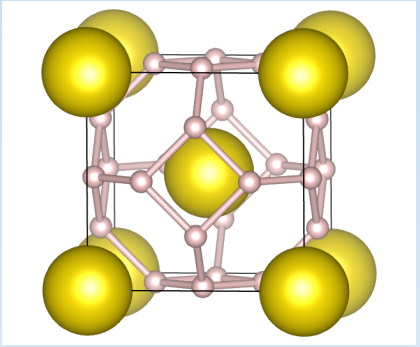
A UCAS post-graduate students spent 2.5 months last autumn visiting Glasgow.

SUPA-China links: Condensed Matter

THE UNIVERSITY of EDINBURGH
School of Physics and Astronomy







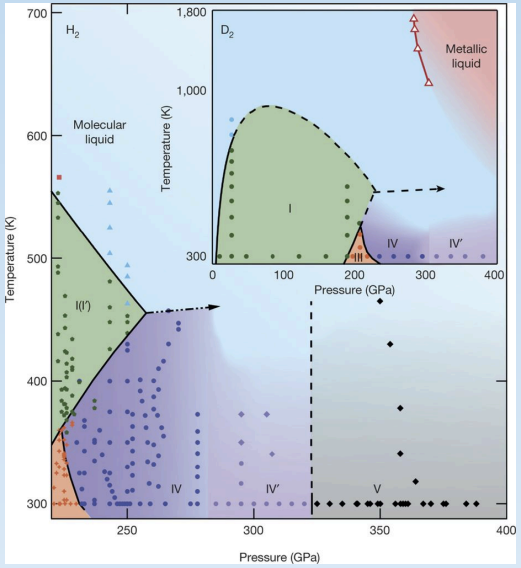
Institution	Partner	SUPA Contact	Research Area
Xi'an Jiantong University	Dr Hongxiang Zong	Prof Graeme Ackland	Atomistic modelling
Neiging Beihang University	Dr Linggang Zhu		Materials modelling
CAEP Inst. Fluid Physics	Prof Hua Geng		Materials modelling
HPSTAR Shanghai	Dr Ross Howie/Dr Philip Dalladay-Simpson	Dr Andreas Hermann	High-pressure physics
Jilin University	Prof Yanming Ma		Structure prediction
Sichuan University	Dr Cheng Lu		Clusters and materials

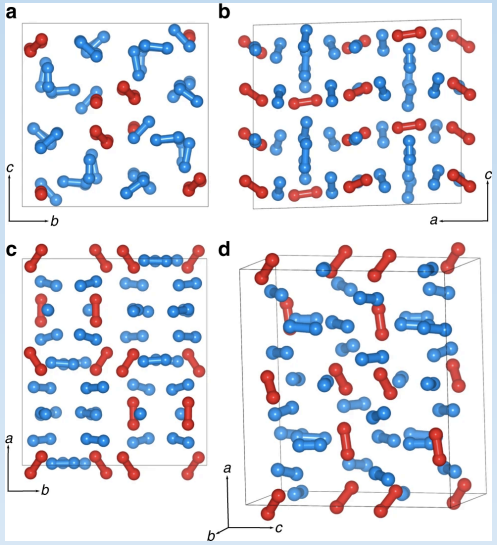
SUPA-China links: Condensed Matter

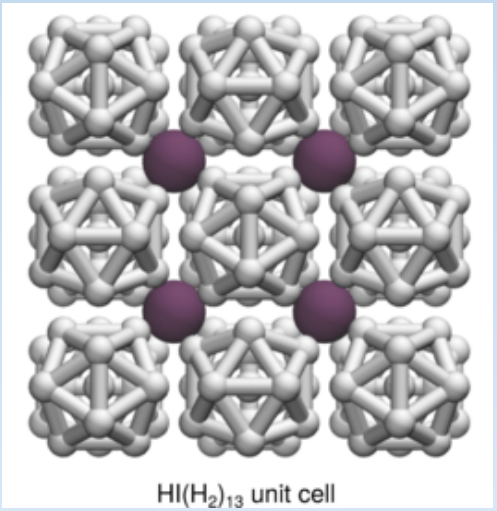
THE UNIVERSITY of EDINBURGH
School of Physics and Astronomy

"Thousand Talents" Program: Prof Eugene Gregoryanz
CAS Institute of Solid State Physics, Hefei

High-pressure science of elements and simple compounds

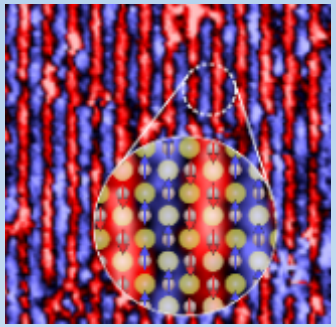


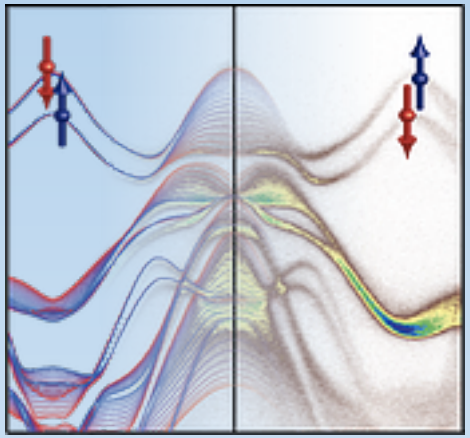


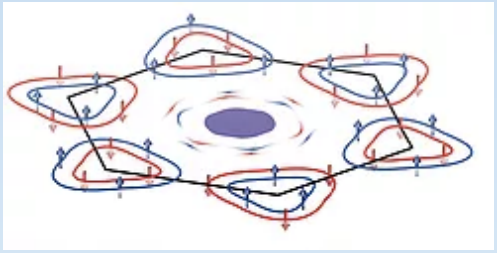


SUPA-China links: Condensed Matter

University of St Andrews | FOUNDED 1413







Institution	Partner	SUPA contact	Research area
Fudan University	Prof Donglai Feng/Dr Darren Peets	Prof Peter Wahl	Superconductivity
Hangzhou University	Prof Stefan Kirchner		Quantum matter
Nanjing University	Prof Yuefeng Nie	Prof Phil King	Transition-metal oxide films
Suzhou Inst. Nanotech.	Dr Jiagui Feng		Transition-metal dichalcogenides

Professor Brian Gerardot: Research collaboration with Chongqing University of Posts and Telecommunications (CQUPT)

Professor Patrik Öhberg: Research collaboration on low-temperature and condensed matter physics with the Institute for Advanced Study at Tsinghua University

Dr. Marcello Ferrera: MSc in the Science of Light, a Heriot-Watt and Nankai University partnership

Dr. Xu Wang: Long-term research collaborations with Chinese Universities (Tsinghua, Sun Yat-sen, Fudan, SJTU, UESTC, USST) and Chinese Academy of Science on high-speed optical communication and Ultra-fast imaging technologies.

- Joint BEng Programme on Telecommunication Engineering with Xidian University.

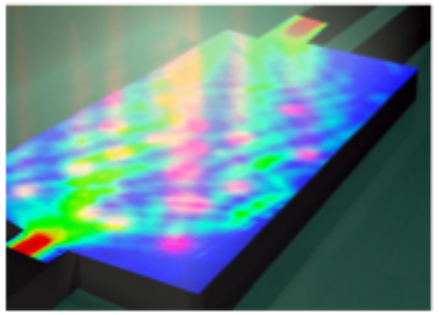
Professor Derryck Reid: Links to Nanjing Institute of Astronomical Optics & Technology (NIAOT) of the Chinese Academy of Sciences (CAS), Tianjin and Dongguan Universities.

HERIOT WATT UNIVERSITY

Dr. Marcello Ferrera
School of Engineering and Physical Sciences
Heriot-Watt University, UK
m.ferrera@hw.ac.uk

ASN Nanophotonics Structured Advanced Lab

http://www.asn-lab.org/



Dr. Ferrera is also
Program director
MSc in the Science of Light
Heriot-Watt/Nankai partnership

Prof. Yi Hu
Nankai Univ.
Research collaboration:
Integrated nonlinear optics

NANKAI UNIVERSITY 1919

Prof. Zhigang Chen
San Francisco State Univ.
and Nankai Univ.
Research collaboration:
Integrated nonlinear optics

Advancing in Science
Seminal Lectures
Nankai University
(Summer 2018)

Experimental Nanophotonics Group

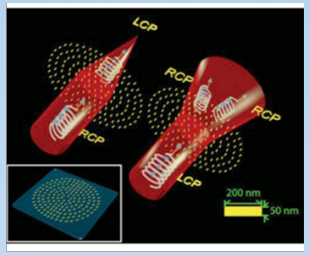
HERIOT WATT UNIVERSITY

E-mail: x.chen@hw.ac.uk

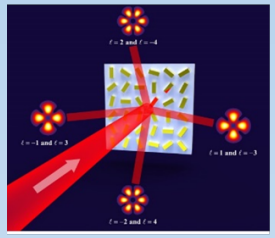
http://nanophotonicslab.eps.hw.ac.uk/

Xianzhong Chen

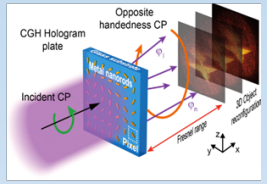
陈献忠



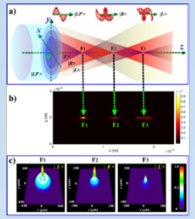
Nature Communications 2012



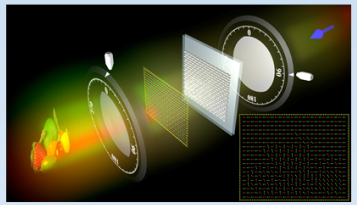
Advanced Materials 2017



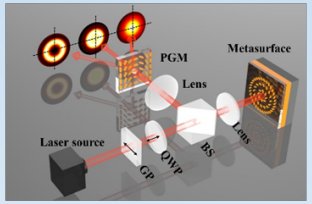
Nature Communications 2013



Advanced Optical Materials, 2015



Advanced Materials 2018

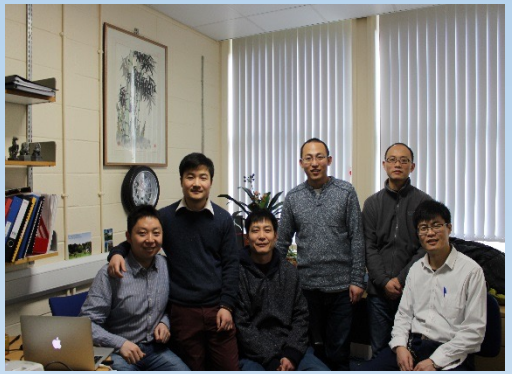


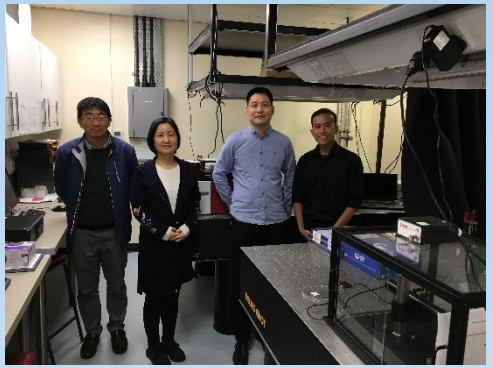
ACS Photonics, 2016

Over 15 collaboration papers

Current collaborators in China:

南开大学 陈树琪 团队
北京理工 黄玲玲团队
南方科技大学 李贵新团队
武汉大学 郑国兴团队
首都师范大学 张岩团队





Visit scholars

南开大学、上海理工大学、重庆交通大学、桂林电子大学、兰州大学、昆明理工大学

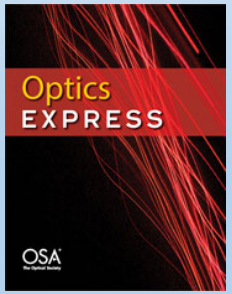
Prof. Derryck T. Reid

School of Engineering & Physical Sciences,

Heriot-Watt University

D.T.Reid@hw.ac.uk

HERIOT WATT UNIVERSITY



High power tunable femtosecond ultraviolet laser source based on an Yb-fiber-laser pumped optical parametric oscillator

Chenglin Gu,[1] Minglie Hu,[*,1] Jintao Fan,[1] Youjian Song,[1] Bowen Liu,[1] Lu Chai,[1] Chingyue Wang,[1] and Derryck T. Reid[2]

[1]*Ultrafast Laser Laboratory, Key Laboratory of Opto-electronics Information Technology (Ministry of Education), College of Precision Instruments and Opto-electronics Engineering, Tianjin University, 300072 Tianjin, China*

[2]*Scottish Universities Physics Alliance (SUPA), Department of Physics, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK*

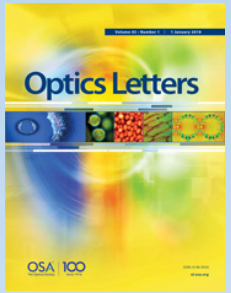
[*] *huminglie@tju.edu.cn*

OSA CLEO EUROPE EQEC 2019 Photonics Society

Oral ED-6.4 16:45 ROOM 1 Hall A1

Towards a Visible to Mid-Infrared Astrocomb for the Extremely Large Telescope — •Yuk Shan Cheng[1], Dong Xiao[2], Richard A. McCracken[1], and Derryck T. Reid[1] — [1]Scottish Universities Physics Alliance (SUPA), Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh EH14 4AS, United Kingdom — [2] CAS Key Laboratory of Astronomical Optics & Technology, Nanjing Institute of Astronomical Optics & Technology, National Astronomical Observatories, Nanjing 210042, China

A nearly-gap-free 1-GHz frequency comb spanning 500–2200 nm is generated from dual supercontinua pumped by a Ti:sapphire laser and phase-coherent degenerate OPO, representing an important precursor to a multi-GHz astrocomb calibrator for the ELT.



High average power, widely tunable femtosecond laser source from red to mid-infrared based on an Yb-fiber-laser-pumped optical parametric oscillator

Chenglin Gu,[1] Minglie Hu,*,[1] Limeng Zhang,[1] Jintao Fan,[1] Youjian Song,[1] Chingyue Wang,[1] and Derryck T. Reid[2]

[1]*Ultrafast Laser Laboratory, Key Laboratory of Opto-electronic Information Science and Technology of Ministry of Education, College of Precision Instruments and Opto-electronics Engineering, Tianjin University, Tianjin 300072, China*

[2]*Scottish Universities Physics Alliance (SUPA), Department of Physics, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK*

*Corresponding author: huminglie@tju.edu.cn

Received March 12, 2013; revised April 21, 2013; accepted April 22, 2013; posted April 24, 2013 (Doc. ID 186925); published May 21, 2013

We report on the highly efficient generation of widely tunable femtosecond pulses based on intracavity second harmonic generation (SHG) and sum frequency generation (SFG) in a MgO-doped periodically poled $LiNbO_3$ optical parametric oscillator (OPO), which is pumped by a Yb-doped large-mode-area photonics crystal fiber femtosecond laser. Red and near infrared from intracavity SHG and SFG and infrared signals were directly obtained from the OPO. A 2 mm $\beta - BaB_2O_4$ is applied for Type I ($oo \rightarrow e$) intracavity SHG and SFG, and then femtosecond laser pulses over 610 nm ~ 668 nm from SFG and 716 nm ~ 970 nm from SHG are obtained with high efficiency. In addition, the oscillator simultaneously generates signal and idler femtosecond pulses over 1450 nm ~ 2200 nm and 2250 nm ~ 4000 nm, respectively.

OCIS codes: (190.4970) Parametric oscillators and amplifiers; (320.7090) Ultrafast lasers.

http://dx.doi.org/10.1364/OL.38.001820

Other connections:

Prof. Zhiyi Wei (CAS, Beijin)

Prof. Zhigang Zhang (Peking Univ.)

Prof. Zhaowei Zhang (HUST, Wuhan)

Photonics

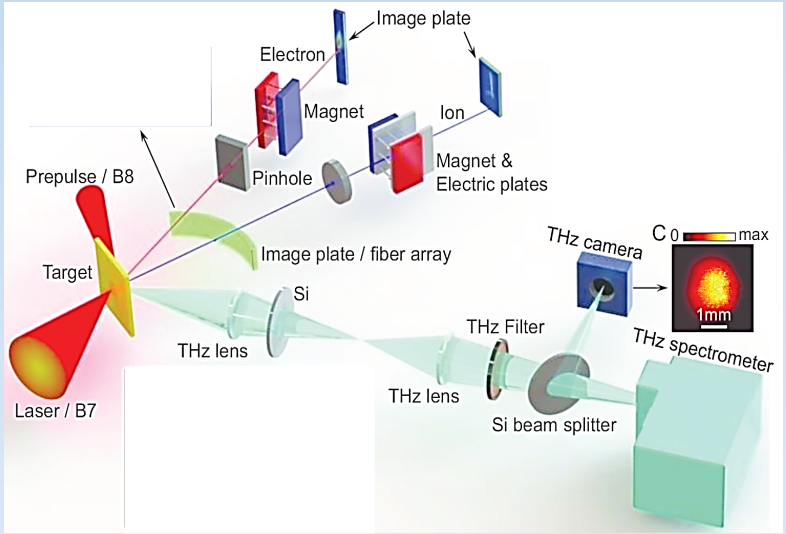
University of St Andrews | FOUNDED 1413

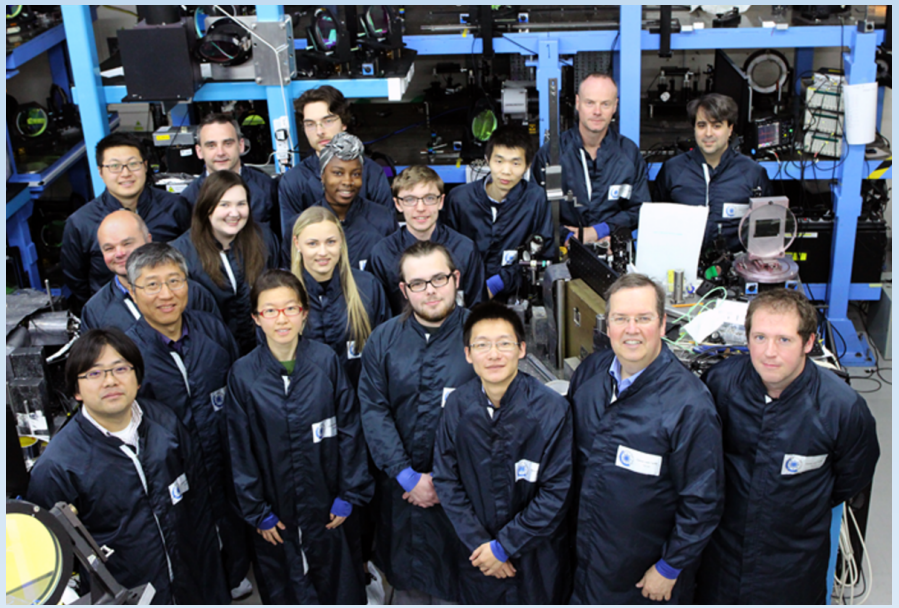
	Universities In China		U. St Andrews
Organic Lasers	Prof Wenjing Tian	**Jilin University**	Prof Ifor Samuel &
Visible Light Communications	Dr Shuyu Zhang	**Fudan University**	Prof Graham Turnbull
Plasmonics	Dr Zhang-Kai Zhou	**Sun Yat-Sen University**	Dr Andrea Di Falco
Single Photon Sources	Prof Pan Jian-Wei	**University of S&T of China**	Prof Sven Hoefling
MSc student exchange	Prof Yufang Chen	**Guilin University of Technology**	Dr Andrea Di Falco
Research & Teaching Programmes	Prof Quentin Parker	**Hong Kong University**	Prof Tom Brown

Strathclyde collaboration with high power laser plasma researchers from Shanghai Jiao Tong University and Institute of Physics, CAS-Beijing

- Research collaborations between Prof. Paul McKenna and CAS-Beijing established since 2009 (~30 joint publications)
- Joint appointment between SJTU and Strathclyde: Prof. Zheng-Ming Sheng
- Topics spanning laser driven particle and radiation sources, laser-fusion research; relativistic laser-plasma physics
- Example result: Record high (tens of mJ) coherent terahertz bursts from picosecond laser-irradiated metal foils: G. Liao *et al*, Proc. Nat. Acad. Sci. 116, 3994 (2019)

Prof Paul McKenna



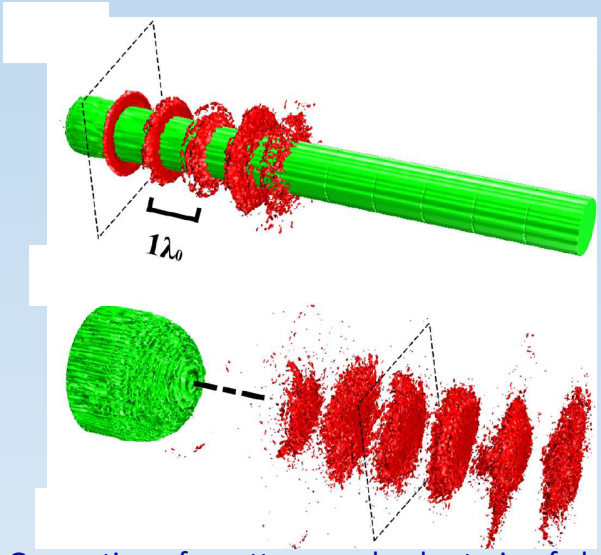


For further information: paul.mckenna@strath.ac.uk

Strathclyde collaboration with high power laser plasma researchers from National University of Defense Technology, Changsha

- Research collaborations between Prof. Paul McKenna and NUDT established since 2013
- Hosted Visiting Researchers: Prof. Tong-Pu Yu and Dr. Han Xu (one year visits)
- Topics spanning laser-fusion studies to high field and attosecond physics
- Example result: Introduction of a new scheme for the generation of attosecond bunches of energetic electrons: Li-Xiang Hu *et al*, Optics Letters, 43, 2615 (2018)

Prof Paul McKenna



Generation of an attosecond pulse train of electrons (red) from a laser-irradiated wire (green) (From L-X Hu et al., Sci. Rep., 8, 7282 (2018)

The Strathclyde laser-plasma group are regular participants in the High Power Laser Science and Engineering International Conference in Suzhou, China

For further information: paul.mckenna@strath.ac.uk

Collaborations: Thin Films

InnovateUK Shanghai UK Industrial Challenge Programme

UWS Innovation - Microwave Plasma Assisted Sputtering

"Apparatus and methods for depositing durable optical coatings", application number GB1706581.4, Filing date 25th April 2017, Inventors Des Gibson and Shigeng Song

Benefits of UWS Sputtering

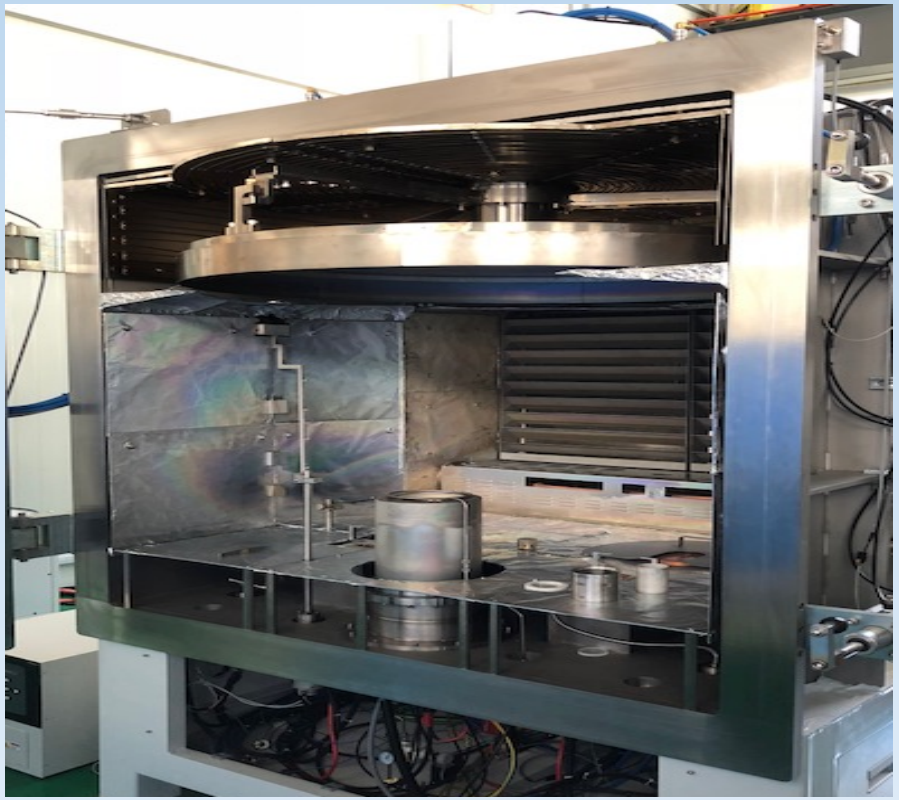
- Non-reactive process
- Independent control of co-deposited materials
- Enhanced thickness control

Novel microwave plasma sputter deposition process providing enhanced optical coatings
Partners: Orion Photonics Ltd, Helia Photonics Ltd, UWS, Shanghai Jason Vacuum Co Ltd
Funding: £490,441; Duration: 36 months

Collaborations: Thin Films

University of the West of Scotland Plasma Source Deployment – China based electron beam deposition system

Royal Academy of Engineering. UK-China Industry Academia Partnership Programme 2018, "*High Density Plasma Assisted Electron Beam Deposition of Precision Optical Coatings offering enhanced throughput and retrofitability to existing & new deposition systems", Partners:* University of the West of Scotland, Tongji University, Shanghai, Jason Vacuum Company Shanghai, Changchun University of Science & Technology



1.35m box coater

Plasma source benefits:

- Low temperature processing
- Densified coatings
- Bulk optical properties
- High deposition rates

Addresses next stage high throughput optical thin film requirements in China market

Collaborations: Healthcare

- UWS collaborating on a UK GCRF project with **Fudan University, Shanghai** (Engineering & Medical Faculties)
- Progressing a low cost point of care breath analysis sensor aimed at early stage diagnosis and management of chronic respiratory condition [particularly asthma and chronic obstructive pulmonary disease exacerbated by air pollution].
- A pump priming project for a future UK/ China Newton fund proposal submission or InnovateUK healthy aging call.