PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A

Continuing its long history of influential scientific publishing, Phil. Trans. R. Soc. A publishes high quality theme issues on topics of current importance and general interest within the physical, mathematical and engineering sciences, guest-edited by leading authorities and comprising new research, reviews and opinions from prominent researchers. Each issue aims to create an original and authoritative synthesis, often bridging traditional disciplines, which showcases current developments and provides a foundation for future research, applications and policy decisions.

rsta.royalsocietypublishing.org

EDITOR
C. David Garner

COMMISSIONING EDITOR
Bailey Falcon

EDITORIAL COORDINATOR
Ruth Mihc

PRODUCTION EDITOR
Thadacha Ratanasawarin

EDITORIAL BOARD
Kazuyuki Aihara
Henrik Alfredsson
Chunli Bai
Katharine Cashman
Jack Connor
Athina Coustansis
Andrew Cooper
Ikeka De Moorul
Caterina Ducati
Bayor Fox-Kemper
Prabha Gia
Marie-Pierre Gaugott
Robin Garrell
Isabelle Gallagher
Nigel Glover
Joanna Heigh
Yushiro Ishikawa
Nick Jenkins
Brian Keinatt

Richard Kerovell
Ying-Cheng Lai
Stephen Liddle
Simon Lilly
Mike Lovell
David May
Paul Miliewski
Nicolas Mousissopoulos
Tim Palmer
Vincent Poor
Stuart Robinson
Misao Sasaki
Gordon Semenoff
Simone Severini
John Shepherd
Ajay Sood
Ingrid Stains
Douglas Stephan
Iain Stewart
Howard Stone
John Meurig Thomas
Bryan Webber
Colin Wilson
Xuesong Wu
Mazhar Xie
Hiroshi Yamaguchi
Nan Yao
Julia Yeomans
Qiang Zhang

SUBSCRIPTIONS
In 2017 Phil. Trans. R. Soc. A (ISSN 1364-503X) will be published 26 times a year. For more details of subscriptions and single issue sales please contact our fulfilment agent:

Turpin Distribution
The Royal Society Customer Services
Froggatt Drive
Stratton Business Park
Bristol BS34
SG18 8TG

T: +44 17 676 1640
F: +44 17 676 1640
E: royalsociety@turpin-distribution.com

Alternatively, please contact our customer service team at:
E: sales@royalsociety.org

SUBSCRIPTIONS
For submission guidelines and access to journal content visit:
rsta.royalsocietypublishing.org

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A: MATHEMATICAL, PHYSICAL AND ENGINEERING SCIENCES
ISSN 1364-503X
© The Royal Society, 2017

Except as otherwise permitted under the Copyright, Designs and Patents Act, 1988, this publication may only be reproduced, stored or transmitted, in any form or by any other means, with the prior permission in writing of the publisher, or in the case of reprographic reproduction, in accordance with the terms of a licence issued by the Copyright Licensing Agency. In particular, the Society permits the making of a single photocopy of an article from this issue (under Sections 29 and 38 of this Act) for an individual for the purposes of research or private study. Open access articles, which are published under a CC-BY licence, may be re-used without permission, but subject to acknowledgement.

SUBSCRIPTIONS

PRICES FOR 2017

<table>
<thead>
<tr>
<th></th>
<th>Online only</th>
<th>Online and print</th>
</tr>
</thead>
<tbody>
<tr>
<td>£ UK/Rest of World</td>
<td>£2,450</td>
<td>£3,430</td>
</tr>
<tr>
<td>€ Europe</td>
<td>€3,187</td>
<td>€4,461</td>
</tr>
<tr>
<td>$ US/Canada</td>
<td>$4,646</td>
<td>$6,504</td>
</tr>
</tbody>
</table>

Cover image
Blue Quantum (2012) - oil paint and glass on canvas by Laura Pesce. Laura Pesce is a visual artist based in Tuscany - www.LauraPesce.it - working with blown and fused glass mainly. Since the early 1990s her work has been inspired by new concepts in physics.
The Royal Society is a self-governing Fellowship of many of the world’s most distinguished scientists drawn from all areas of science, engineering, and medicine. The Society’s fundamental purpose, as it has been since its foundation in 1660, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity.

The Society’s strategic priorities emphasise its commitment to the highest quality science, to curiosity-driven research, and to the development and use of science for the benefit of society. These priorities are:

- Promoting science and its benefits
- Recognising excellence in science
- Supporting outstanding science
- Providing scientific advice for policy
- Fostering international and global cooperation
- Education and public engagement

For further information on the Royal Society
The Royal Society
6 – 9 Carlton House Terrace
London SW1Y 5AG
T +44 20 7451 2500
W royalsociety.org

For further information on Philosophical Transactions of the Royal Society A
T +44 20 7451 2214
E philtransa@royalsociety.org
W rsta.royalsocietypublishing.org