



ABN 76 470 896 415

# The Royal Society of New South Wales

*"for the encouragement of studies and investigations in Science Art Literature and Philosophy"*

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3 April 2014

## Fellows of the Society

Michael Archer AM  
Elizabeth Blackburn AC  
Robert Clark  
David Craig AO  
Peter Doherty AC  
Noel Hush AO  
Barry Jones AO  
Kurt Lambeck AO  
Eugenie Lumbers  
Lord May of Oxford AC  
Brian Schmidt AC  
Michelle Simmons  
Richard Stanton AO  
Jill Trewhella  
Bruce Warren

Professor Gérard Mourou,  
Director, IZEST,  
École Polytechnique,  
Palaiseau 91 128  
FRANCE

Dear Professor Mourou,

## EXPRESSION OF INTEREST

### Background

For over forty years the École Polytechnique (EP) has been a key player in the laser field with its Laboratoire d'Utilisation des Lasers Intenses (LULI) (suppression of fast electrons by frequency doubling, detailed analysis of plasma instabilities, particle acceleration), Laboratoire d'Optique Appliquée (LOA) (particle acceleration) and, more recently, its Institut de la Lumière Extrême (ILE) which introduced the concept of Extreme Light to France and to Europe with the ELI program.

Since the first demonstrations of the laser 50 years ago, the Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA) has played a pioneering role in the laser-matter interaction field with the demonstration of the first neutron and the CPA concept on a large laser chain.

In 2011, EP and CEA agreed to utilise their considerable know-how by collaborating in the field of fundamental, high-energy physics with high intensity lasers. This is at the frontier of contemporary physics. This collaboration project, International Centre for Zezwatt and Exawatt Science and Technology (IZEST) intends creating the first international centre dedicated to the exploration of fundamental physics coming from laser-matter interaction beyond the exawatt regime.

The Royal Society of New South Wales (the Society) has members with expertise in laser technology and is a meeting-place for academics and other intellectuals with research interests across a wide range of fields, including laser physics, plasma physics, nuclear physics and the utilisation of these technologies across a broad spectrum of applications.

*(cont'd...)*

## Expression of Interest

The Royal Society of New South Wales

The Society is interested in this research programme and promoting the development of IZEST with respect to the application of the technology to peaceful and non-military purposes. The Society expects that it may assist with the development of collaboration between research laboratories in France and in New South Wales and other States of Australia in the area of extreme light science, the application of these technologies and the promotion of partnerships between interested laboratories to form consortia capable of performing research that is complementary with the IZEST programme.

### Activities

Activities of the Society may include but need not be limited to:

1. Liaising between IZEST and interested parties in New South Wales and other States of Australia to encourage research collaboration and other activities.
2. Providing a neutral place in Australia for the discussion of emerging research and other ideas and to engage with interests outside the specific area of high-energy lasers across any sector of interest within the community.
3. Building upon existing links with IZEST<sup>1</sup>.
4. Through keeping track of these discussions, become a repository of knowledge regarding this technology and, from time-to-time, publishing these in the in the Society's peer-reviewed publication the *Journal and Proceedings of the Royal Society of New South Wales*, in both regular and special editions of the journal.

The Society looks forward to engagement in the research programme as it progresses.

Yours faithfully,

The Royal Society of New South Wales

Donald Hector PhD  
PRESIDENT

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<sup>1</sup> For example, work presented in papers and communications at the IZEST international conference at the French Embassy in Tokyo 18-20 November 2013:

- Your ground-breaking paper regarding extreme laser power using fibre lasers (*Nature Photon.* 7 (2013) 218) is of special interest for the Australian National Centre of Excellence (CUDOS) (B. Eggleton, director, University of Sydney) world-leading centre working on photonics and non-linear optics.
- Your pioneering work on chirped pulse amplification (CPA) provided insight into ultra-high acceleration of plasma blocks. This led to cooperation with a team in Australia (for many years led by H. Hora, University of NSW) and co-authorship with yourself (*Physics Letters A* 377 (2013) 885).
- The application of ultra-fast accelerated plasma blocks for hadron cancer therapy (R. Banati) led to a publication under the editorial management of V. Malka from École Polytechnique (*Journal of Intense Pulses Lasers and Applications In Advanced Physics* 4 (2014) 11).