

PAPER • OPEN ACCESS

XXXII IUPAP Conference on Computational Physics

To cite this article: 2022 *J. Phys.: Conf. Ser.* **2207** 011001

View the [article online](#) for updates and enhancements.

You may also like

- [XXVI IUPAP Conference on Computational Physics \(CCP2014\)](#)
A W Sandvik, D K Campbell, D F Coker et al.
- [Efficient algorithms for computing ground states of the 2D random-field Ising model](#)
Argyro Mainou, Nikolaos G Fytas and Martin Weigel
- [Corrections to scaling in geometrical clusters of the 2D Ising model](#)
Michail Akritidis, Nikolaos G Fytas and Martin Weigel



The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Extended abstract submission deadline: April 22, 2022

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD



Submit your abstract



XXXII IUPAP Conference on Computational Physics

Damien Foster¹, Nikolaos G. Fytas¹, Charo del Genio¹, Ran Holtzman¹, Abhishek Kumar¹, Susanne Horn¹, Alban Potherat¹, Martin Weigel², and Taras Yavors'kii¹

¹ Centre for Fluid and Complex Systems, Coventry University, Coventry CV1 5FB, United Kingdom

² Institut für Physik, Technische Universität Chemnitz, 09107 Chemnitz, Germany

E-mail: martin.weigel@physik.tu-chemnitz.de

The 32nd IUPAP Conference in Computational Physics was held online August 2–5, 2021 with organizational support from Coventry University. The Conference in Computational Physics series of meetings is held annually under the auspices of the International Union of Pure and Applied Physics (IUPAP) at international locations alternating typically between Europe, the Americas, and the Asian and Pacific regions. It covers all areas of the computational sciences with a relation to physical applications, making it the largest and leading recurrent international meeting in computational physics. Typical topics covered include statistical mechanics and complex systems, soft matter and biophysics, materials and nano-science, fluid dynamics, quantum many-body physics, quantum computing, lattice field theory, astrophysics, gravitation and cosmology, novel hardware and software, computational physics education, machine learning and algorithms as well as geophysics and porous media. The format combines plenary overview lectures with a broad range of topical parallel sessions featuring invited impact talks as well as oral contributions and poster sessions, complemented by discussion sessions.

The organisation of the 2020 meeting was given to the present group of organisers for a meeting to be held in physical presence in Coventry. It was planned for August 2020, but with the advent of the Coronavirus pandemic it was decided in April 2020 to postpone the meeting to 2021 with the hope of holding it on site. We were quite confident back then that the meeting could be held face-to-face in 2021, but the virus proved to be more persistent than we had envisaged, such that CCP2021 was held entirely online. While this disappointed some, it also offered a number of opportunities to explore new forms of scientific and social interaction. We used a virtual conference centre constructed in Gather Town that included spaces for poster sessions and exhibition space for sponsors as well as many opportunities for formal and informal discussions among participants. All oral presentations were delivered on Zoom, with the vast majority of talks delivered live and a handful of pre-recorded videos. To support discussions revolving around the presentations, we also ran a discussion space on Slack with channels for each session and a common discussion forum. All oral presentations were recorded and made available to registered participants on the conference website at <https://ccp2021.complexity-coventry.org>.

The conference featured 425 registrations, with 296 fully completed, coming from a wide range of countries, with the most represented being Japan, the United Kingdom, the United States of America, Germany, India, France, Russia and China. The program consisted of 15 plenary speakers, listed below, as well as 33 invited talks, 100 contributed talks and 72 poster contributions. The scientific sessions were complemented by cultural presentations as well as the award session for the IUPAP Young Scientist Prizes in Computational Physics which for



2020 and 2021 were awarded to Zhijun Wang and Prineha Narang, respectively. In total, these contributions led to a very exciting program, and the technical setup allowed for a rather interactive meeting. Although the actual experience might not quite have matched up to that of a traditional face-to-face conference, it was felt by many that this meeting format also has its upsides as it is more inclusive, more ecological, more diverse, and more family friendly than the traditional one.

All authors of accepted contributions to the conference were invited to submit a full paper to the proceedings. These papers are collected in the present volume, covering all major areas represented at the conference and thus providing an excellent representation of where computational physics research stands today.

We would like to thank all participants of the conference, all contributors to the scientific program and all authors of papers in this proceedings volume. Finally, we would like to acknowledge support for the conference by the IUPAP, the European Physical Society (EPS), the Institute of Physics (IOP), Coventry University, Technische Universität Chemnitz, the European Physical Journal (EPJ), Computation (MDPI), Entropy (MDPI), and MapleSoft.

Local organising Committee

- Damien Foster
- Nikolaos G. Fytas
- Charo del Genio
- Ran Holtzman
- Abhishek Kumar
- Susanne Horn
- Alban Potherat
- Martin Weigel (chair)
- Taras Yavors'kii

International advisory board

Joan Adler, Technion, Haifa

Nithaya Chetty, Wits University, Johannesburg

Mei-Yin Chou, Academia Sinica, Taipei

Bismarck Vaz da Costa, Universidade Federal de Minas Gerais, Belo Horizonte

Yuan Ping Feng, National University of Singapore

Suklyun Hong, Sejong University, Seoul

Andrew Horsfield, Imperial College, London

Trevis Humble, Oak Ridge National Laboratory

Barry Klein, University of California Davis

Georg Kresse, University of Vienna

David Landau, University of Georgia, Athens

Hai-Qing Lin, Computational Science Research Center, Beijing

Richard Liska, Czech Technical University, Prague

Priya Mahadevan, Bose Centre, Kolkata

Regina Maphanga, Council for Scientific and Industrial Research, Pretoria

Sitangshu Bikas Santra, Indian Institute of Technology, Guwahati

Lev Shchur, Landau Institute of Theoretical Physics, Chernogolovka

Laurette Tuckerman, École Supérieure de Physique et de Chimie Industrielles, Paris

Roser Valentí, University of Frankfurt

Daniel Vizman, West University of Timișoara
Rodolphe Vuilleumier, École Normale Supérieure, Paris
Xiaoqun Wang, Shanghai Jiao Tong University
Renata Wentzcovitch, Columbia University, New York
Junyi Zhu, Chinese University of Hong Kong

Program Committee

Statistical mechanics and complex systems

Wolfhard Janke, University of Leipzig (chair)
Youjin Deng, University of Science and Technology of China, Hefei
Jonathan Machta, University of Massachusetts, Amherst
Lev Shchur, Landau Institute of Theoretical Physics, Chernogolovka

Soft matter, biophysics

Julia Yeomans, University of Oxford (chair)
Anna Balazs, University of Pittsburgh
Changbong Hyeon, Korea Institute for Advanced Study, Seoul

Materials and nano-science

Luca Ghiringhelli, Fritz Haber Institute, Berlin (chair)
Francesca Baletto, King's College London
Silvana Botti, University of Jena
Bryan Goldsmith, University of Michigan, Ann Arbor
James Kermode, University of Warwick, Coventry
Sergey Levchenko, Skolkovo Innovation Center, Moscow

Fluid dynamics

Greg Sheard, Monash University, Melbourne (chair)
Bruno Carmo, University of São Paulo
Wisam Al Saadi, Australian College of Kuwait

Quantum many-body physics

Anders Sandvik, Boston University (chair)
Sylvain Capponi, University of Toulouse
Kedar Damle, Tata Institute of Fundamental Research, Mumbai
Chisa Hotta, University of Tokyo
Shiwei Zhang, Flatiron Institute, New York

Quantum computing

Stephen Jordan, Microsoft Corporation (chair)
David Gosset, University of Waterloo
Artur Izmaylov, University of Toronto
Bei Zeng, University of Guelph

Lattice field theory

Constantina Alexandrou, Cyprus Institute, Nikosia (chair)
Gert Aarts, Swansea University
Karl Jansen, Deutsches Elektronen-Synchrotron, Zeuthen
Aida X. El-Khadra, University of Illinois, Urbana-Champaign

Astrophysics, gravitation, cosmology

Raphael Hirschi, University of Keele (chair)

Novel hardware and software

Massimo Bernaschi, National Research Council, Rome (chair)

Valeri Halyo, Princeton University

Victor Martin-Mayor, Complutense University of Madrid

Computational physics education

Joan Adler, Technion, Haifa (chair)

Amy Graves, Swarthmore College

Machine learning and algorithms

Lenka Zdeborova, École Polytechnique Fédérale de Lausanne (chair)

Chiara Cammarota, King's College London

Alexander Hartmann, University of Oldenburg

Ehsan Katami, San José State University

Maria Schuld, University of KwaZulu-Natal, Durban

Pan Zhang, Chinese Academic of Sciences, Beijing

Geophysics and porous media

Steve Tobias, University of Leeds (chair)

Emmanuel Dormy, Centre National de la Recherche Scientifique, Paris

Geoff Vallis, University of Exeter

Plenary Speakers

Dwight Barkley, University of Warwick, Coventry

Ludovic Berthier, University of Montpellier

Sergio Boixo, Google Research

Gábor Csányi, University of Cambridge

Christine Davies, University of Glasgow

Claudia Draxl, Humboldt University Berlin

Steven Gottlieb, Indiana University, Bloomington

Prineha Narang, Harvard University, Cambridge

Annalisa Pillepich, Max Planck Institute for Astronomy, Heidelberg

Frank Pollmann, Technical University of Munich

Andrew Saxe, University of Oxford

Olga Shishkina, Max Planck Institute for Dynamics and Self-Organization, Göttingen

David Thirumalai, University of Texas, Austin

Zhijun Wang, Chinese Academy of Sciences, Beijing

Andy Woods, University of Cambridge

Invited Speakers

Gert Aarts, Swansea University

Ronojoy Adhikari, University of Cambridge

Tim Atherton, Tufts University, Medford

Titus Beu, Babeş-Bolyai University, Cluj

Juan Carrasquilla, Vector Institute, Toronto
Philippe Corboz, University of Amsterdam
Sean Couch, Michigan State University, East Lansing
Stefano Curtarolo, Duke University, Durham
Thomas Guillet, University of Exeter
Vera Gülpers, University of Edinburgh
Itay Hen, University of Southern California, Los Angeles
Silke Henkes, University of Bristol
Susanne Horn, Coventry University
Estelle Inack, Perimeter Institute, Waterloo
Jaehyeok Jin, University of Chicago
Naoki Kawashima, University of Tokyo
Boris Kozinsky, Harvard University, Cambridge
Justin Leontini, Swinburne University of Technology, Melbourne
Valerio Lucarini, University of Reading
Cristian Micheletti, Scuola Internazionale Superiore di Studi Avanzati, Trieste
Mario Motta, International Business Machines Corporation, Almaden
Kostas Orginos, College of William & Mary, Williamsburg
Ludivine Oruba, Sorbonne Université, Paris
Laura Ratcliff, Imperial College, London
Martin Roetteler, Microsoft Corporation
Josh Romero, Nvidia, Portland
Stefan Schnabel, University of Leipzig
Hui Shao, Beijing Normal University
Jemma Shipton, University of Exeter
Mario Spera, Scuola Internazionale Superiore di Studi Avanzati, Trieste
Miles Stoudenmire, Flatiron Institute, New York
Lei Wang, Chinese Academic of Sciences, Beijing
Christopher White, University of Maryland, College Park