Members of International Scientific Board
(status March 2014)

Baha Balantekin (Chair)  
Univ. of Wisconsin

Angela Bracco (NuPECC)  
Univ. of Milano

Francois Gélis  
CEA Saclay

Paul-Henri Heenen  
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Maria Paola Lombardo  
INFN Frascati

Judith McGovern  
Univ. of Manchester

Piet Mulders  
Free Univ. of Amsterdam

Arturo Polls  
Univ. de Barcelona

Johanna Stachel  
Univ. Heidelberg

Search for new Board member replacing Arturo Polls
(decision to be taken at next ECT* Board Meeting, 6 June 2014)
Scientific Activities at ECT*

- International **workshops** and **collaboration meetings** (typically 20 events with ca. 700 - 800 visitors per year)
- **Doctoral training** program  
  (6 - 8 weeks intense lecture series for advanced PhD students)
- **Postdoctoral** program & **local research @ ECT**  
  (7 - 9 postdocs & senior research associates) + **visiting scientists**

Currently active **research topics @ ECT***:

**QCD and Hadron Physics, Phases of QCD, Nuclear Structure and Reactions, Nuclear Astrophysics and Neutron Stars, Many-Body Theory, Computational Physics**

- Typically 30-40 publications in respectable journals per year

- **New** postdoc appointment in autumn 2014  
  application period ended January 15 → **94 applications**

- Good perspectives for one additional **new** postdoc (INFN - TIFPA)
Workshop Participants
Visitors and DTP Students
2013

Visitors at ECT* per country in 2013
total: 850
Annual Report
2013

European Centre for Theoretical Studies in Nuclear Physics and Related Areas
Trento

Institutional Member of the European Science Foundation Expert Committee NuPECC

Edited by:
Susan Driessen
&
Gian Maria Ziglio
In this chapter, we present the European landscape of current Nuclear Physics facilities, plans for building new large-scale research infrastructures (RIs) or performing major upgrades of existing ones, and the collaboration in the field at European and global level.

3.1 Existing Research Infrastructures and Upgrades

Europe may be grouped into theoretical and computing, lepton and hadron beam facilities. They form a network of closely collaborating laboratories that enjoy the strong support of the European Union via their Framework Programme (FP) 7. Access to these research infrastructures is generally open to researchers whose proposals have passed the scrutiny of programme advisory committees.

3.1.1 Theory and Computing

Both ECT* in Trento and the Jülich Supercomputer Centre (JSC) are key players in the European and international scientific community. ECT* has achieved high visibility and fulfills an important coordinating function in the various areas of research.

ECT*, Trento, Italy

ECT* is the only centre of its kind in Europe and faces new opportunities and challenges in the gradual move from the traditional paper-driven to a more international coordination. The Centre is the only Italian institution to host a European Doctoral Training Programme, and it is the only one to oversee the AuroraScience project. ECT* is the only centre of its kind in Europe and faces new opportunities and challenges in the gradual move from the traditional paper-driven to a more international coordination.

Jülich Supercomputer Centre, Germany

The Jülich Supercomputing Centre (JSC) is a European facility that aims to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately 5 to 3 in terms of capability. Today, the JSC's strategy is a dual architecture to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately 5 to 3 in terms of capability.

2014 PROGRAMME OF ACTIVITIES

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-28 February</td>
<td>Quantum Mechanics Tests in Particle, Atomic, Nuclear and Complex Systems: 50 Years after Bell's Renowned Theorem Organisers: B. Hiesmayr (University of Freiburg), C. Curceanu (LNF – INFN Frascati), A. Buchleitner (University of Basel)</td>
</tr>
<tr>
<td>March 24-26</td>
<td>Breakup Reactions of Exotic Nuclei and Related Topics Organisers: P.H. Heenen (Université Libre de Bruxelles), J. Dobaczewski (University of Warsaw), H. Leeb (TU Vienna), F.-K. Thielemann (University of Basel)</td>
</tr>
<tr>
<td>7-11 April</td>
<td>Simulating the Supernova Neutrinosphere with Heavy Ion Collisions Organisers: C. Horowitz (Indiana University), J. Natowitz (Texas A&amp;M University), L. Roberts (Caltech), H. Wolter (University of Munich)</td>
</tr>
<tr>
<td>April 7 – May 16</td>
<td>Doctoral Training Program: Heavy Ion Collisions and Matter under Extreme Conditions Organisers: F. Gélis (CEA Saclay), J.Y. Ollitrault (CEA Saclay)</td>
</tr>
<tr>
<td>14-18 April</td>
<td>QCD and Forward Physics at the LHC Organisers: C. Royon (CEA Saclay), G. Soyez (CEA Saclay), A. Szczurek (PAN Krakow)</td>
</tr>
<tr>
<td>5-9 May</td>
<td>Three-Body Forces: from Nucleon to Nuclei Organisers: A. Gezerlis (University of Guelph), K. Hebeler (IKP, TU Darmstadt &amp; EMMI), H. Hergert (Ohio State University), V. Soma (IKP, TU Darmstadt)</td>
</tr>
<tr>
<td>12-16 May</td>
<td>Hydrodynamics for Strongly Coupled Fluids Organisers: T. Schäfer (North Carolina State University), J. Sangyong (McGill University), P. Romatschke (University of Colorado)</td>
</tr>
<tr>
<td>21-23 May</td>
<td>Future Directions in the Physics of Nuclei at Low Energies Organisers: U. van Kolck (IPN Orsay), F. Azaiez (IPN Orsay), K. Blaum (MPI für Kernphysik Heidelberg), Achim Schwenk (Technische Universität Darmstadt)</td>
</tr>
<tr>
<td>26-30 May</td>
<td>Low-Energy Reaction Dynamics of Heavy-Ions and Exotic Nuclei Organisers: A. Diaz-Torres (ECT*), N. Antonenko (Bogoliubov Laboratory of Theoretical Physics), P. Gomes (Universidade Federal Fluminense)</td>
</tr>
<tr>
<td>09-13 June</td>
<td>Interdisciplinary Workshop on Statistical and Analysis Methods in Nuclear, Particle and Astrophysics Organisers: A. Müller (Excellence Cluster Universe, Munich), S. Paul (TU Munich)</td>
</tr>
<tr>
<td>17-20 June</td>
<td>New Frontiers in Multiscale Modelling of Advanced Materials Organisers: S. Taioli (Bruno Kessler Foundation &amp; University of Trento), N. Pugno (University of Trento), M. Dapor (Bruno Kessler Foundation, Trento)</td>
</tr>
<tr>
<td>23-27 June</td>
<td>Resonances and Non-Hermitian Quantum Mechanics in Nuclear and Atomic Physics Organisers: C. Forssén (Chalmers University of Technology, Göteborg), N. Zinner (Aarhus University), R. Kaiser (INL, Nice)</td>
</tr>
<tr>
<td>June 30 – July 4</td>
<td>Exciting Baryons: Design and Analysis of Complete Experiments for Meson Photoproduction Organisers: L. Tiator (University of Mainz), J. Ryckebusch (University of Ghent), A. D’Angelo (University of Rome)</td>
</tr>
<tr>
<td>July 14 – Aug. 1</td>
<td>TALENT: Training in Advanced Low Energy Nuclear Theory Density Functional Theory and Self-Consistent Methods Organisers: M. Hjorth-Jensen (Michigan State University and University of Oslo), G. Orlandini (University of Trento), D. Vretenar (University of Zagreb), N. Schunck (Lawrence Livermore National Laboratory), P. Ring (TU Munich), S. Bogner (Michigan State University)</td>
</tr>
<tr>
<td>25-29 August</td>
<td>Spin and Orbital Angular Momentum of Quarks and Gluons in the Nucleon Organisers: M. Anselmino (University of Torino), E. Leader (Imperial College), C. Lorcé (IPN Orsay &amp; Univ. Liège)</td>
</tr>
<tr>
<td>22-26 September</td>
<td>Dyson-Schwinger Equations in Modern Mathematics &amp; Physics Organisers: M. Pitschmann (TU Vienna), W. Lucha (IHEP, Vienna), C. Roberts (Argonne National Laboratory)</td>
</tr>
<tr>
<td>6-10 October</td>
<td>QCD Hadronization and the Statistical Model Organisers: R. Stock (FIAS, Frankfurt), F. Becattini (University and INFN Florence), M. Bleicher (FIAS Frankfurt)</td>
</tr>
<tr>
<td>27-31 October</td>
<td>Achievements and Perspectives in Low-Energy QCD with Strangeness Organisers: C. Curceanu (LNF – INFN Frascati), L. Fabbietti (TU Munich), C. Guaraldo (INFN Frascati), J. Mares (Nuclear Physics Institute, ASCR, Rez), J. Marton (SMI, Vienna), U.-G. Meissner (University of Bonn)</td>
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</tbody>
</table>
EKT* Scientific Program 2014

- **Workshops, Collaboration Meetings** and **Training Programmes**

- **Nuclear Structure and Reactions**
- **Nuclear Astrophysics**
- **QCD and Hadron Physics**
- **Hot and Dense QCD Matter**
  - Related Areas: Astrophysics
  - Particle Physics
  - Quantum Many-Body Systems
  - Condensed Matter

**Training 2014:**

Heavy-Ion Collisions and Matter under Extreme Conditions
(F. Gélis and J.Y. Ollitraut)

**TALENT 2014:** Training in Advanced Low-Energy Nuclear Theory
(M. Hjorth-Jensen et al.)
3.1 Existing Research Infrastructures and Upgrades

Europe may be grouped into theoretical and computing, lepton and hadron beam facilities. They form a network of closely collaborating laboratories that enjoy the strong support of the European Union via their Framework Programme (FP) 7. Access to these research infrastructures is generally open to researchers whose proposals have passed the scrutiny of programme advisory committees following a north to south principle of arrangement.

3.1.1 Theory and Computing

ECT* in Trento and the Jülich Supercomputer Centre (JSC) are at the heart of this network. The Jülich Supercomputer Centre (JSC), a European facility jointly owned and operated by Forschungszentrum Jülich, RWTH Aachen University, and the University of Konstanz, employs about 600 people and has about 700 visiting scientists from about 40 countries. It is the place to attend yearly held Doctoral Training Programmes and to apply for projects. ECT* in Trento is the only centre of its kind in Europe and faces new opportunities and challenges in the gradual transition to more international coordination.

ECT*, Trento, Italy

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Jülich Supercomputer Centre, Germany

The Jülich Supercomputer Centre (JSC) is a European facility jointly owned and operated by Forschungszentrum Jülich, RWTH Aachen University, and the University of Konstanz. It employs about 600 people and has about 700 visiting scientists from about 40 countries. JSC's strategy is a dual architecture to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately three, in terms of capability. Today, the fully equipped machine is called JUQUEEN.

ECT* Doctoral Training Programme 2014

April 7 - May 16

Heavy Ion Collisions: exploring nuclear matter under extreme conditions

Programme Coordinators
François Gélis (Saclay) and Jean-Yves Ollitrault (Saclay)

Student Coordinator and Advisor
Georges Ripka (Saclay and ECT*)

Lecturers and topics

Derek Teaney (Stony Brook, USA)  Relativistic hydrodynamics
Guilherme Milhano (CENTRA, Lisbon & CERN, Switzerland)  Jets in heavy ion collisions
Gregory Soyez (Saclay, France)  Jets in heavy ion collisions
Marco van Leeuwen (Universiteit Utrecht, Netherlands)  Experimental techniques
Mikko Laine (Universität Bern, Switzerland)  QCD at finite temperature
Dionysis Triantafyllopoulos (ECT* Trento, Italy)  Color Glass Condensate
François Gélis (Saclay, France)  Color Glass Condensate
Peter Arnold (University of Virginia, USA)  Strong coupling techniques
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ECT*, Trento, Italy

ECT* has achieved high visibility and fulfills an important coordinating function in the European and international scientific community by:

- Meeting per year on the topical problems listed and strengthening thereby the interchange between theoretical and experimental physicists, an absolute prerequisite for the advancement in the various areas of research.
- Providing a platform for international collaboration through Doctoral Training Programmes and arranging for them to participate in ECT* research projects.
- Overseeing the AuroraScience project which consists of interdisciplinary proposals that explore the architectural opportunities for high performance computing applications in Physics, Biology, Bioinformatics and Medical Physics.
- Being overseen by an internationally composed Scientific Board.

ECT* is the only centre of its kind in Europe and faces new opportunities and challenges in the gradual more international coordination.

Jülich Supercomputer Centre, Germany

The Jülich Supercomputing Centre (JSC), a European centre of excellence, is the fourth best European supercomputer in the field of supercomputing. The JSC's strategy is a dual architecture to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately three in terms of capability. Today, the JSC's strategy is a dual architecture to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately three in terms of capability. Today, the

ECT* Nuclear TALENT School 2014
July 14 – August 01
Density functional theory and self-consistent methods

Organizers
Morten Hjorth-Jensen (Michigan State University and University of Oslo)
Giuseppina Orlandini (University of Trento)

Student Coordinator and Advisor
Morten Hjorth-Jensen (Michigan State University and University of Oslo)

Local Coordinator
Serena degli Avancini (ECT*)

Topics
Basic techniques of quantum many-body physics
Density functional theory for atoms and nuclei
Applications of nuclear DFT

Lecturers
Scott Bogner (Michigan State University)
Peter Ring (Technical University Munich)
Nicolas Schunck (Lawrence Livermore National Laboratory)
Dario Vretenar (University of Zagreb)

Applications
Applications for the ECT* Nuclear Talent School should be made electronically through the ECT* Login page. It should include: a curriculum vitae, a 1-page description of academic and scientific achievements, a short letter expressing the applicant’s personal motivation for attending the course.

In addition, a reference letter from the candidates’ supervisor should be sent directly to (email is fine):

Professor Wolfram Weise - Director of ECT* - Strada delle Tabarelle, 286, I - 38123 Villazzano (TN), Italy (email: serenada@ectstar.eu, fax: +39 0461 314747)

Deadline for applications: April 01, 2014
Funding agencies and supporting institutions

New Memorandum of Understanding coordinating contributions to ECT* for 2014+

Local support:

- Fonds voor Wetenschappelijk Onderzoek (FWO)
- Fondazione Bruno Kessler (FBK)
- Helsinki Institute of Physics
- INFN
- IN2P3
- CEA
- Centre for Nuclear Studies in Debrecen
- Wigner Research Centre for Physics
- Science & Technology Facilities Council

Belgium
Finland
France
Germany
Hungary
Italy
Poland
Romania
United Kingdom
**Contributions 2013 and 2014 of European Funding Agencies and Institutions to ECT**
based on MoU 2008-2013 and **new MoU 2014+** (signed Sept. 2013) plus addenda

<table>
<thead>
<tr>
<th>Country</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium (FWO)</td>
<td>10.000</td>
<td>10.000</td>
</tr>
<tr>
<td>Belgium (FNRS)</td>
<td>10.000</td>
<td>10.000</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>11.000</td>
<td>11.000</td>
</tr>
<tr>
<td>Denmark</td>
<td>6.700</td>
<td>?</td>
</tr>
<tr>
<td>Finland</td>
<td>8.000</td>
<td>8.000</td>
</tr>
<tr>
<td>France (CEA)</td>
<td>35.000</td>
<td>35.000</td>
</tr>
<tr>
<td>France (CNRS)</td>
<td>65.000</td>
<td>65.000</td>
</tr>
<tr>
<td>Germany</td>
<td>100.000 + 10.000</td>
<td>100.000 + 20.000</td>
</tr>
<tr>
<td>Greece</td>
<td>(3.000) no payments</td>
<td>?</td>
</tr>
<tr>
<td>Hungary</td>
<td>2.000</td>
<td>2.000</td>
</tr>
<tr>
<td>Italy (INFN)</td>
<td>100.000 + 10.000</td>
<td>100.000 + 10.000</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4.000</td>
<td>(7.500) under negotiation</td>
</tr>
<tr>
<td>Poland</td>
<td>5.000</td>
<td>10.000</td>
</tr>
<tr>
<td>Romania</td>
<td>6.000</td>
<td>6.000</td>
</tr>
<tr>
<td>Spain</td>
<td>(20.000) no payments</td>
<td>?</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>25.000</td>
<td>26.000</td>
</tr>
</tbody>
</table>
BUDGET and STATUS of FUNDING (contd.)

- **Spain**: agreement finally signed for 2012 contribution
  no payment for 2013 -- no plan for 2014+

- **Denmark**: restructuring of funding program (?)
  **The Netherlands**: negotiations with NIKHEF (promising)

- **Non-contributors:**
  - **Austria, Norway, Sweden, Switzerland**
    - ... a case for **NuPECC** to take initiative

- **New rule from 2014 onward:**
  Visitors to ECT* from non-contributing European countries
  are understood to be fully self-supporting
BUDGET and STATUS of FUNDING

Contributions to ECT*
Annual Running Budget 2014 (tentative)

France: 0.10
Germany: 0.12
Italy: 0.11
Others: 0.09
Eu Projects: 0.16

0.48 MEuro

expected total: ~ 1.06 MEuro
Joint Ventures present and future

- Joint projects & publications involving ECT* and LISC / UniTN researchers

**Perspectives:**

Interdisciplinary Laboratory of Computational Science @ FBK

- Towards an association of ECT* with

**TIFPA**

Trento Institute for Fundamental Physics and Applications

INFN postdoctoral position @ ECT* (under advanced discussion)
Cooperation Agreements

- Nuclear & Hypernuclear Theory
- Phases of QCD
- Nuclear Astrophysics
- Lattice Field Theories

- Cooperation Agreement with RIKEN Nishina Center (signed in 2013)

- Cooperation Agreement with National Astronomical Observatory of Japan (signed in 2013)

- Planned / ongoing:
  - Japan: negotiations with RIKEN about joining MoU
  - Korea: preparations for cooperation agreement with APCTP
  - China: contacts concerning options for cooperation
ECT*: **TransNational Access** within **HadronPhysics3** (2012-2014)

QUTE-EUROPE (2013-2016)

**... towards HORIZON 2020**

**HadronPhysicsHorizon (HPH)**

- Application of ECT* for **TNA** within **HadronPhysicsHorizon** (from 2015) (submitted - kickoff meeting Bochum)

**ENSAR2**

- Application of ECT* for **TNA** within **ENSAR2** (from 2015) (submitted - SSC meeting @ GSI)