NuPECC Meeting

FZ Jülich

15-16 March 2013

European Centre for Theoretical Studies in Nuclear Physics and Related Areas

ECT* headquarters:
Villa Tambosi
Villazzano
Trento, Italy

ECT* Wolfram Weise
and Technische Universität München
The ECT* Mission

1. To be a center of **frontline research** in **nuclear** and **hadron physics**: exploring the **phases** and **structures** of **QCD**

2. To catalyze contacts between **experimental** and **theoretical** studies, as well as between **nuclear physics** and **related areas**

3. To further the **training** of **young researchers**
“Bottom-up” realization supported by large community
(ECT* Associates > International Scientific Board)

Large flux of international visitors (700 - 800 per year)

Strong local support by the Autonomous Province of Trento (PAT)
through the Fondazione Bruno Kessler (FBK)

Multinational Memorandum of Understanding
funding agencies of European countries + EU Projects

Annual ECT* running budget: ca. 1.1 MEuro
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. We follow a north to south principle of arrangement.

3.1.1 Theory and Computing

Both ECT* in Trento and the Jülich Supercomputer Centre JSC, a European infrastructure institute, are 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 transition to more international coordination. ECT* is highly appreciated by the large and diverse community of theoretical physicists.

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.
- Overseeing the annual Doctoral Training Programmes and arranging for them to participate in ECT* research projects.
- Managing 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.

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

Jülich Supercomputer Centre, Germany

The Jülich Supercomputing Centre (JSC), a European infrastructure institute, is a European Research Infrastructure. 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 five to three, in terms of capability. Today, the JSC's infrastructure is 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 transition to more international coordination.

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

Members of International Scientific Board
(status March 2013)

Baha Balantekin (Chair)           Univ. of Wisconsin
Angela Bracco (NuPECC)           Univ. of Milano
Francois Gélis                   CEA Saclay
Maria Paola Lombardo             INFN Frascati
Judith McGovern                  Univ. of Manchester
Piet Mulders                     Free Univ. of Amsterdam
Arturo Polls                     Univ. de Barcelona
Achim Schwenk                    TU Darmstadt
Johanna Stachel                  Univ. Heidelberg
**ECT* provides TransNational Access and “brain-storming” facilities for EU Projects**

**European Research Infrastructures**

- Accelerator laboratory JYFL, University of Jyväskylä, Finland
- Electron accelerator ELSA, University of Bonn, Germany
- European Centre for Theoretical Studies in Nuclear Physics and Related Areas, ECT*, Trento, Italy
- Forschungszentrum Jülich, FZJ (COSY and HPC), Jülich, Germany
- Institut de Physique Nucléaire, IPNO, Orsay, France
- Grand Accélérateur National d’ions Lourds, GANIL (SPIRAL), Caen, France

**HadronPhysics**

- Helmholtzzentrum für Schwerionenforschung GmbH, GSI, Darmstadt, Germany
- European Organisation for Nuclear Research, CERN (ALICE, AD, COMPASS and ISOLDE), Genève, Switzerland
- Kernfysisch Versneller Instituut, KVI, Groningen, The Netherlands

**ENSAR**

- Laboratori Nazionali del Sud of INFN, LNS, Catania, Italy
- Laboratori Nazionali di Frascati of INFN, LNF, Frascati, Italy
- Laboratori Nazionali di Legnaro of INFN, LNL, Legnaro (Padova), Italy
- Mainzter Mikrotron, MAMI, University of Mainz, Germany
- Max-lab, University of Lund, Sweden
Scientific Activities at ECT*

- International **workshops** and **collaboration meetings**
  (typically ca. 20 events per year)

- **Doctoral training** program
  (6 - 8 weeks intense lecture series for advanced PhD students)

- **Postdoctoral** program & **local research @ ECT**
  (10 postdocs & senior research associates)

- **Visiting scientists** program

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

Number of ECT* Visitors per Country
2012

- Germany
- France
- Italy
- Japan
- Poland
- Spain
- Great Britain
- USA

Country

ECT*, Trento, Italy
### ECT* Workshops 2013

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Organisers</th>
</tr>
</thead>
<tbody>
<tr>
<td>04-13 February</td>
<td>Physics at a Fixed Target Experiment Using the LHC Beams</td>
<td>J.P. Lansberg (IN2P3, Paris), S. Brodsky (SLAC Stanford), E. Ferreiro (Univ. de Santiago de Compostela), F. Fleuret (CNRS/IN2P3), A. Rakotozafindrabe (CEA Saclay), I. Schienbein (LPSC-CNRS/IN2P3), U. Uggerhøj (Univ. of Aarhus)</td>
</tr>
<tr>
<td>18-22 February</td>
<td>Scattering and Annihilation Electromagnetic Processes</td>
<td>S. Pacetti (Univ. e INFN di Perugia), M. Maggiora (Univ. e INFN di Torino), E. Tomasi-Gustafsson (CNRS/IN2P3), R. Baldini Ferroli (Enrico Fermi Center e LNF), F. Iachello (Yale), F. Maas (Univ. of Mainz)</td>
</tr>
<tr>
<td>02-05 April</td>
<td>Heavy Quarks and Quarkonia in Thermal QCD</td>
<td>S. Kim (Univ. of Sejong), M. Laine (Univ. of Bern)</td>
</tr>
<tr>
<td>10-12 April</td>
<td>Constraining the Hadronic Contributions to the Muon’s Anomalous Magnetic Moment (g-2)µ</td>
<td>M. Vanderhaeghen and A. Denig (Univ. of Mainz)</td>
</tr>
<tr>
<td>06-10 May</td>
<td>Workshop on Proton–Nucleus Physics at the LHC</td>
<td>F. Arleo (LAPTH), D. d’Enterria (CERN)</td>
</tr>
<tr>
<td>10-14 June</td>
<td>From Few-Nucleon Forces to Many-Nucleon Structure</td>
<td>R. Roth (TU Darmstadt), B. Barrett (Univ. of Arizona), R. Machleidt (Univ. of Idaho)</td>
</tr>
<tr>
<td>17-21 June</td>
<td>H3QCD (High Energy, High Density and Hot QCD)</td>
<td>C. Marquet (CPhT, École Polytechnique), F Gélis and E. Iancu (CEA/Saclay), D. Triantafyllopoulos (ECT*)</td>
</tr>
<tr>
<td>01-05 July</td>
<td>Flavor Structure of the Nucleon Sea</td>
<td>J. Peng and M. Grosse Perdekamp (Univ. of Illinois at Urbana-Champaign), G. Miller (Univ. of Washington), M. Alberg (University of Seattle)</td>
</tr>
<tr>
<td>08-12 July</td>
<td>Nuclear Structure and Astrophysical Applications</td>
<td>H. Lin (Univ. of Washington), S. Gardner (Univ. of Kentucky), F. Llanes-Estrada (Univ. Complutense de Madrid)</td>
</tr>
<tr>
<td>22-26 July</td>
<td>Nucleon Matrix Elements for New-Physics Searches</td>
<td>H. Lin (Univ. of Washington), J. Papavassiliou (Univ. of Kent)</td>
</tr>
<tr>
<td>29 July – August 02</td>
<td>Compton Scattering Off Nucleons</td>
<td>V. Pascalutsa (Univ. of Mainz), E. Downie (George Washington Univ.), H. Fonvieille (Univ. Blaise Pascal), B. Pasquini (Univ. of Pavia)</td>
</tr>
<tr>
<td>02-06 September</td>
<td>QCD-TNT-III From Quarks and Gluons to Hadronic Matter: A Bridge too Far?</td>
<td>D. Binosi (ECT*), C. Aguilar (UNICAMP), J. Papavassiliou (Univ. of Valencia), J. Cornwall (UCLA)</td>
</tr>
<tr>
<td>16-20 September</td>
<td>LC13: Exploring QCD from the Infrared Regime to Heavy Flavour Scales at B-factories, the LHC and a Linear Collider</td>
<td>G. Pancheri (INFN Frascati), G. Corcella (INFN Frascati), F. Richard (LAL - IN2P3), S. Moretti (Univ. of Southampton), S. De Curtis (INFN Firenze), R. Godbole (Indian Institute for Science and Technology)</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Organisers</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
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<tr>
<td>23-27 September</td>
<td>MICRA 2013</td>
<td>C. Ott (California Institute of Technology), A. Arcones (TU Darmstadt), F. Galeazzi (Univ. of Valencia), H.T. Janka (Max Planck Institute for Astrophysics, Garching)</td>
</tr>
<tr>
<td>30 September – 04 October</td>
<td>Neutron-Rich Matter and Neutron Stars</td>
<td>A. Schwenk (EMMI and TU Darmstadt), C. Pethick (Niels Bohr International Academy and Nordita), A. Watts (Univ. of Amsterdam)</td>
</tr>
<tr>
<td>07-11 October</td>
<td>Reactions Involving 12C: Nucleosynthesis and Stellar Evolution</td>
<td>A. Diaz-Torres (ECT*), L.R. Gasques (Univ. of São Paulo), M.C. Wiescher (Univ. of Notre Dame)</td>
</tr>
<tr>
<td>14-18 October</td>
<td>Advances in Time-Dependent Methods for Quantum Many-Body Systems</td>
<td>A. Rios-Huguet (Univ. of Surrey), P. Danielewicz (Michigan State Univ. &amp; National Superconducting Cyclotron Laboratory)</td>
</tr>
<tr>
<td>21-25 October</td>
<td>Strangeness in the Universe? Theoretical and Experimental Progress and Challenges</td>
<td>C. Curceanu (LNF – INFN Frascati), C. Guaraldo (LNF – INFN Frascati), J. Marton and J. Zmeskal (SMI Vienna), J. Mares (NPI, Rez)</td>
</tr>
<tr>
<td>04-08 November</td>
<td>From Nuclear Structure to Particle-Transfer Reactions and Back</td>
<td>J. Dobaczewski (Univ. of Warsaw), M. Płoszajczak (GANIL)</td>
</tr>
</tbody>
</table>
The ECT* Doctoral Training Program

... training the next generations of young scientists and future research leaders
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

ECT* in Trento, Italy

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

1. Providing a platform for meetings 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.

2. To attend yearly held Doctoral Training Programmes and arranging for them to participate in ECT* research projects.

3. Overseeing projects that explore the architectural opportunities for high performance computing applications in Physics, Biology, Bioinformatics and Medical Physics.

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

Jülich Supercomputer Centre, Germany

The Jülich Supercomputing Centre (JSC), a European facility, has a strategy to have always a competitive leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately five to three, in terms of capability. Today, the JSC is highly appreciated by the large and diverse user community.

Furthermore, presently and in the years ahead, ECT* administers scientifically the AuroraScience project which consists of interdisciplinary proposals that explore highly relevant scientific computing applications in Physics, Biology, Bioinformatics and Medical Physics.

Applications and Topics

Applications for the ECT* Doctoral Training Programme 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 participating in the programme.

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 314 747)

Deadline for applications: February 25, 2013
The STAR in ECT*

... Nuclear Physics and RELATED AREAS:

- High-Energy and Elementary Particle Physics
- Astrophysics and Astroparticle physics
- Condensed Matter Physics
  - Ultracold gases
  - Bose-Einstein Condensates
  - Quantum physics of small systems ...
News and Events in 2013

- **Research:**
  Call for ECT* postdoctoral positions 2013
  Openings for 2 positions - 70 applications - selection in process

- **ECT* Evaluation and Review Meeting** (June 21-22)

  ECT* Review Committee Members 2013
  Wanda Alberico (Torino)    Jean-Paul Blaizot (Saclay)    Maurizio Dapor (FBK Trento)
  Wick Haxton (Berkeley)    Paul-Henri Heenen (Brussels)    Paul Hoyer (Helsinki)
  Jochen Wambach (Darmstadt)

- **20th Anniversary of ECT**
  Celebration and Symposium  (September 14)

- **EJFRC (ECT* Joint Finance Review Committee) meeting** September 14

  New MoU to be signed in order to define and coordinate contributions
to ECT* from funding agencies for the next five years (from November 2013)
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

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3.1.1 Theory and Computing

Both ECT* in Trento and the Jülich Supercomputer Centre in Germany are key players in the field.

ECT*, Trento, Italy

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3. To participate in joint science programs.

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) is a European research infrastructure for the simulation of complex physical processes. 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 five to three, in terms of capability. Today, the JSC's strategy includes the use of both a leadership-class machine and a general-purpose system.

The budget for 2013 and beyond is shown in the table below:

<table>
<thead>
<tr>
<th>FBK / PAT</th>
<th>Funding Agencies</th>
<th>EU Projects</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>489</td>
<td>410 *</td>
<td>176</td>
<td>50</td>
</tr>
</tbody>
</table>

* according to present MoU (ending Oct 2013) -> new MoU to be signed
Memorandum of Understanding

between

RIKEN Nishina Center for Accelerator-Based Science (RNC)
2-1, Hirosawa, Wako, Saitama, 351-0198, Japan

and

European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*)
Strada delle Tabarelle, 286, 38123 Villazzano (TN), Italy

In order to foster scientific exchange and to pursue collaborations in theoretical physics between the RIKEN Nishina Center for Accelerator-Based Science (RNC) and the European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), the two institutions agree upon this Memorandum of Understanding (MoU) for conducting the following program based on mutual equality and reciprocity of benefits:

1. The two institutions will seek further opportunities to cooperate in scientific research. The research projects will be defined by mutual agreement of both institutions. The form of cooperation will vary and will be adjusted according to the goals and needs of the joint projects.

2. The two institutions agree to promote the exchange of scientists. To this end, when either of the two institutions invites members of the other institution to participate in scientific exchange and joint research activities, the host institution will normally provide accommodation and cover the living expenses of the visiting scientists, in a form to be defined in each instance, according to the rules and guidelines of the host institutions.

3. This MoU may be modified by mutual written consent. This MoU will become effective on the date of signature by both directors of the two institutions for an initial period of three (3) years. It will be extended for an additional period of three (3) years at each expiration date thereafter under the mutual written consent unless either institution gives six (6) months advance notice in writing to terminate the MoU.

4. Each institution shall designate a person or office to serve as liaison for implementing this MoU.

Date: 8-Jan-2013

Dr. Hideto En’yo
Director
RNC

Date: January 2013

Prof. Dr. Wolfram Weise
Director
ECT*
Memorandum of Understanding

between

National Astronomical Observatory of Japan (NAOJ)
2-21-1, Osawa, Mitaka 181-8588, Japan

and

European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*)
Strada delle Tabarelle, 286, 38123 Villazzano (TN), Italy

In order to foster scientific exchange and to pursue collaborations between the National Astronomical Observatory of Japan (NAOJ) and the European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), the two institutions agree upon this Memorandum of Understanding (MoU) for conducting the following program based on mutual equality and reciprocity of benefits:

Cooperation agreement to be signed in early April 2013
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

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2. To attend yearly held Doctoral Training Programmes and arranging for them to participate in ECT* research projects.
3. To oversee 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.

**Jülich Supercomputer Centre, Germany**

The Jülich Supercomputing Centre (JSC), a European infrastructure (ENIAC) and the largest computing facility in Europe, is a leadership-class, highly scalable machine, and a general-purpose system with a balance of approximately four, 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 to three, in terms of capability.

### Appendix: Contributions 2012 to ECT*

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PAYMENT REQUEST SENT</th>
<th>CONTRIBUTION ASKED FOR</th>
<th>CONTRIBUTION RECEIVED ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>no</td>
<td></td>
<td>withdrawn from ECT</td>
</tr>
<tr>
<td>Belgium FWO (Flemish)</td>
<td>May 23</td>
<td>10,000</td>
<td>04/07/2012</td>
</tr>
<tr>
<td>Belgium Walloon (French speaking part)</td>
<td>May 23</td>
<td>10,000</td>
<td>03/07/2012</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>May 23</td>
<td>11,000</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>May 23</td>
<td>6,700</td>
<td>17/07/2012</td>
</tr>
<tr>
<td>Finland</td>
<td>May 23</td>
<td>8,000</td>
<td>20/07/2012</td>
</tr>
<tr>
<td>France CEA (Saclay)</td>
<td>May 23</td>
<td>35,000</td>
<td>21/06/2012</td>
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<td>France CNRS</td>
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<td>17/07/2012</td>
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<tr>
<td>Germany</td>
<td>May 23</td>
<td>100,000</td>
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</tr>
<tr>
<td>Greece</td>
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<td>3,000</td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>May 23</td>
<td>1,000</td>
<td>03/09/2012</td>
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<tr>
<td>Italy (INFN)</td>
<td>May 23</td>
<td>100,000</td>
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<tr>
<td>Netherlands</td>
<td>May 23</td>
<td>4,000</td>
<td>09/07/2012</td>
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<tr>
<td>Poland</td>
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<td>10/07/2012</td>
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<tr>
<td>Romania</td>
<td>May 23</td>
<td>6,000</td>
<td></td>
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<tr>
<td>Spain</td>
<td>May 24</td>
<td>20,000</td>
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</tr>
<tr>
<td>UK</td>
<td>May 23</td>
<td>25,000</td>
<td>25/07/2012</td>
</tr>
</tbody>
</table>

Received so far: € 369,700  
Total (expected): € 409,700  
Total 2011: € 409,700