

# Director's Report

Jochen Wambach  
ECT\* & TUDa

- Structure of ECT\*
- Scientific Activities 2017
- Research @ ECT\*
- Budget and status of funding 2017
- Budget outlook 2017





## REGULATIONS - STATUTES

# EUROPEAN CENTRE FOR THEORETICAL STUDIES IN NUCLEAR PHYSICS AND RELATED AREAS - (ECT\*)

FOUNDATION BRUNO KESSLER

2008

### Art. 1 GOALS

The ECT\* is European in conception and operates in a context of European Universities and Laboratories. The goals of the ECT\* are:

- a) to promote in-depth research on topical problems at the forefront of contemporary developments in theoretical nuclear physics;
- b) to foster interdisciplinary contacts between nuclear physics and neighbouring fields such as particle physics, astrophysics, condensed matter physics and the quantal physics of small systems;
- c) to encourage talented young physicists by arranging for them to participate in the activities of the ECT\*, by organizing training projects and establishing networks of active young researchers;
- d) to strengthen the interaction between theoretical and experimental studies.



## **The ECT\* Mission**

- 1. To be a center of frontline research in theoretical nuclear physics**
- 2. To promote active contacts between theory and experiments, and to related areas of research**
- 3. To further the training of young researchers**



## **The ECT\* Mission**

**1. To be a center of frontline research  
in theoretical nuclear physics**

**from QCD to hadrons,  
nuclei and strongly  
interacting matter  
under extreme conditions**

**to foster active contacts between  
theory and experiments,  
and related areas of research**

**3. To further the  
training of young researchers**





## **The ECT\* Mission**

- 1. To be a center of frontline research in theoretical nuclear physics**
- 2. To promote active contacts between theory and experiments, and to related areas of research**
- 3. To further the training of young researchers**

**high-energy particle physics,  
astrophysics,  
condensed matter physics,  
computational physics, ...**

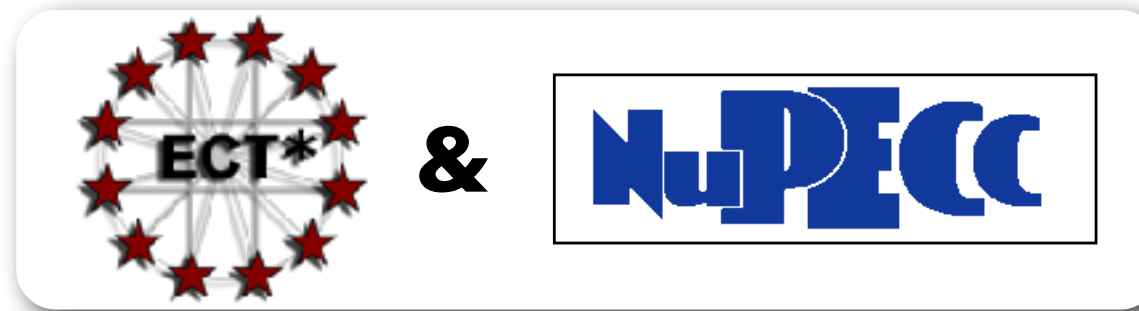


Established in 1993 ...  
... unique in **Europe**



- “Bottom-up” realization supported by large community  
(ECT\* **Associates** → International **Scientific Board**)

Gert <b>Aarts</b> (chair)	Univ. Swansea
Omar <b>Benhar</b>	INFN Rome
Angela <b>Bracco</b> (NuPECC)	Univ. Milano
Nicole <b>d’Hose</b>	CEA, Saclay
Morten <b>Hjorth-Jensen</b>	Univ. Oslo & Michigan State Univ.
Ubirajara <b>van Kolck</b>	CNRS - INP Orsay
Sanjay <b>Reddy</b>	INT & Univ. Washington, Seattle
Dirk <b>Rischke</b>	Univ. Frankfurt
Marc <b>Vanderhaeghen</b>	Univ. Mainz



- **ECT\*** continues to be associated with **NuPECC**
- **NuPECC** continues to act as the European Nuclear Physics committee associated with the **European Science Foundation (ESF)** as an **Expert Board**
  - strengthen European collaboration in nuclear physics
  - define a network of complementary facilities within Europe and encourage optimization of their usage
  - provide a forum for the discussion of the provision of future facilities and instrumentation
  - issue recommendations on the development, organization, and support of European nuclear physics, and of particular projects
- **ESF** redefined itself in 2016 in a new role and profile as a **service-based organization** within the new European science landscape (“Science Europe”)
- New **NuPECC Long Range Plan** (completed in spring 2017):  
**6 working groups** (Hadron Physics, Properties of Strong-Interaction Matter, Nuclear Structure and Reaction Dynamics, Fundamental Symmetries and Interactions, Applications and Societal Benefits)





ECT\*

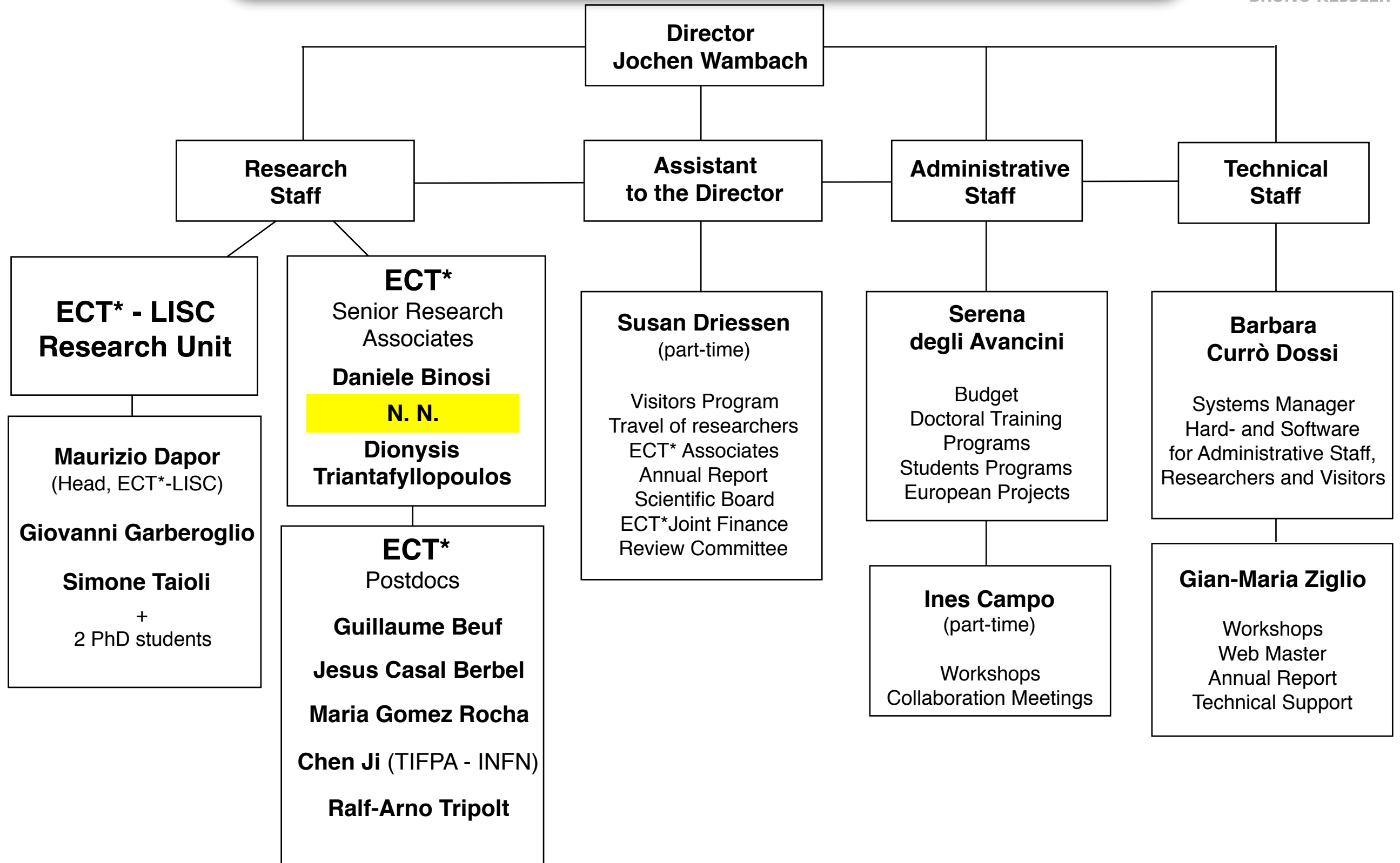


- Since January 2015:  
**Interdisciplinary Laboratory for Computational Science of FBK** has become a **Research Unit of ECT\*** with its own **separate budget** (~ 400 k€ in 2016) and administrative support from FBK.
- **3 ECT\* - LISC researchers:**  
Maurizio **Dapor** (Head of ECT\*-LISC Research Unit)  
G. **Garberoglio**, S. **Taioli** + 2 PhD students
- ECT\* - LISC research activities in the “**Related Areas**”:  
computational **material science**,  
electron spectroscopy,  
biomolecular systems and **interdisciplinary activities**
- Series of **Joint ECT\* - LISC Seminars**





# STRUCTURE and ORGANIZATION of ECT\* (2017)





&

**TIFPA**

Trento Institute for  
Fundamental Physics and Applications



... promotes and coordinates frontier research in particle and nuclear physics, related fields and technologies. **TIFPA** is a joint initiative of **INFN**, **University of Trento**, **FBK** and **APSS** (Province of Trento Healthcare Agency - Proton Therapy Centre)

- **Acting Director of TIFPA:**  
**Marco Durante**  
(former Director of the Biophysics Department at GSI, Darmstadt)



- **President of FBK** (since 2015):  
**Francesco Profumo**  
(former Minister of Education of Italy)





# Scientific Activities 2017



# ECT\* Scientific Events 2017



- **20 accepted workshops (out of 26 proposals)**

## 2017 PROGRAMME OF ACTIVITIES

6-10 February	<b>Unraveling the Complexity of Nuclear Systems: Single-Particle and Collective Aspects Through the Looking Glass</b> Organisers: D. Lacroix ( <i>IPN Orsay</i> ), P. Capel ( <i>University of Bruxelles</i> ), G. Colò ( <i>University of Milano</i> ), M. Colonna ( <i>LNS-Catania</i> ), M. Grasso ( <i>IPN Orsay</i> ), A. Moro ( <i>University of Sevilla</i> )	10-14 July	<b>Open Quantum Systems: From Atomic Nuclei to Ultracold Atoms and Quantum Optics</b> Organisers: H.W. Hammer ( <i>TU Darmstadt</i> ), M. Efremov ( <i>University of Ulm</i> ), C. Forsen ( <i>Chalmers University of Technology</i> ), M. Gattobigio ( <i>Université de Nice-Sophia Antipolis, INLN, CNRS</i> )
27 February-3 March	<b>QCD Challenges in pp, pA and AA Collisions at High Energies</b> Organisers: R. Schicker ( <i>University of Heidelberg</i> ), G. Contreras Nuno ( <i>Czech Technical University</i> ), V. Goncalves ( <i>Universidade Federal de Pelotas</i> ), A. Szczurek ( <i>Institute of Nuclear Physics Krakow</i> )	17-28 July	<b>The Charm and Beauty of Strong Interactions</b> Organisers: B. El-Bennich ( <i>Universidade Cruzeiro do Sul</i> ), L. Tolos ( <i>ICE, CSIC-IEEC</i> ), M. Oka ( <i>Tokyo Tech and ASRC, JAEA</i> ), J. Nieves ( <i>Instituto de Fisica Corpuscular IFIC, CSIC and University of Valencia</i> ), A. Bashir ( <i>Universidad Michoacana de San Nicolas Hidalgo</i> ), K. Brinkman ( <i>Justus-Liebig-Universität Giessen</i> ), U. Wiedner ( <i>Ruhr-Universität Bochum</i> )
20-24 March	<b>Superfluidity and Pairing Phenomena: From Cold Atomic Gases to Neutron Stars</b> Organisers: A. Sedrakian ( <i>University of Frankfurt</i> ), J. W. Clark ( <i>Washington University St. Louis</i> ), E. Krotschek ( <i>University at Buffalo SUNY</i> )	21-25 August	<b>Functional Methods in Hadron and Nuclear Physics</b> Organisers: B.J. Schäfer ( <i>Justus-Liebig-Universität Giessen</i> ), J.M. Pawłowski ( <i>University of Heidelberg</i> ), D. Rischke ( <i>Johann Wolfgang Goethe-Universität Frankfurt</i> )
3-7 April	<b>The Proton Mass: At the Heart of Most Visible Matter</b> Organisers: Z.-E. Meziani ( <i>Temple University</i> ), B. Pasquini ( <i>University of Pavia</i> ), J. Qiu ( <i>Brookhaven National Laboratory</i> ), M. Vanderhaeghen ( <i>University of Mainz</i> )	11-15 September	<b>LFC17: Old and New Strong Interactions from LHC to Future Colliders</b> Organisers: G. Corcella ( <i>INFN, Laboratori Nazionali di Frascati</i> ), S. De Curtis ( <i>INFN Firenze</i> ), S. Moretti ( <i>University of Southampton</i> ), G. Pancheri ( <i>INFN, Laboratori Nazionali di Frascati</i> ), R. Tenchini ( <i>INFN Pisa</i> ), M. Vos ( <i>Universidad de Valencia</i> )
10-14 April	<b>Walk on the Neutron-Rich Side</b> Organisers: S. Gandolfi ( <i>Los Alamos National Laboratory</i> ), V. Somà ( <i>CEA Saclay</i> )	25-29 September	<b>Prospects on the Microscopic Description of Odd-Mass Nuclei and other Multi-Quasiparticle Excitations with Beyond-Mean-Field and Related Methods</b> Organisers: L. Robledo ( <i>Universidad Autonoma de Madrid</i> ), M. Bender ( <i>Institut de Physique Nucleaire de Lyon</i> ), T.R. Rodriguez ( <i>Universidad Autonoma de Madrid</i> )
8-12 May	<b>Space-Like and Time-Like Electromagnetic Baryonic Transitions</b> Organisers: B. Ramstein ( <i>IPN Orsay</i> ), P. Cole ( <i>Idaho State University</i> ), A. Sarantsev ( <i>University of Bonn and Gatchina</i> )	9-13 October	<b>New Perspectives on Neutron Star Interiors</b> Organisers: G. G. Barnaföldi ( <i>Wigner Research Centre for Physics, Budapest</i> ), G. Baym ( <i>University of Illinois at Urbana-Champaign</i> ), L. Tolos ( <i>ICE, CSIC-IEEC</i> )
22-26 May	<b>Landau Fermi-Liquid Theory in Nuclear and Many-Body Systems</b> Organisers: A. Rios-Huguet ( <i>University of Surrey</i> ), D. Davesne ( <i>University/ IPN Lyon</i> ), A. Pastore ( <i>University of York</i> )	23-27 October	<b>ASTRA: Advances and Open Problems in Low-Energy Nuclear and Hadronic STRAnge Physics</b> Organisers: C. O. Curceanu ( <i>LNF-INFN</i> ), E. Hiyama ( <i>RIKEN</i> ), J. Marton ( <i>SMI-Vienna</i> ), J. Pochodzalla ( <i>University of Mainz</i> ), I. Vidaña ( <i>University of Coimbra</i> )
5-9 June	<b>Bridging Nuclear and Gravitational Physics: the Dense Matter Equation of State</b> Organisers: A. Carbone ( <i>TU Darmstadt</i> ), A. Bauswein ( <i>Heidelberger Institut für Theoretische Studien</i> ), J.M. Lattimer ( <i>Stony Brook University</i> ), J.A. Clark ( <i>Georgia Institute of Technology</i> )	6-10 November	<b>Dilepton Productions with Meson and Antiproton Beams</b> Organisers: J.C. Peng ( <i>University of Illinois at Urbana-Champaign</i> ), W. C. Chang ( <i>Academia Sinica, Taipei</i> ), S. Platchkov ( <i>IRFU, CEA Saclay</i> ), O. Teryaev ( <i>Bogolubov Laboratory of Theoretical Physics</i> )
12-16 June	<b>Nuclear Astrophysics in the Gravitational-Wave Astronomy Era</b> Organisers: F. Panzarale ( <i>Cardiff University</i> ), B. Giacomazzo ( <i>Università di Trento and INFN-TIFPA</i> ), O. Benhar ( <i>INFN/Università "La Sapienza", Rome</i> )	20-24 November	<b>Axions at the Crossroads: QCD, Dark Matter, Astrophysics</b> Organisers: A. Mirizzi ( <i>University of Bari</i> ), M.P. Lombardo ( <i>INFN Laboratori Nazionali di Frascati</i> )
12-30 June	<b>Doctoral Training Programme: Microscopic Theories of Nuclear Structure, Dynamics and Electroweak Currents</b> Organiser: O. Benhar ( <i>INFN/Università "La Sapienza", Rome</i> )	27 November-1 December	<b>Phase Diagram of Strongly-Interacting Matter: From Lattice QCD to Heavy-Ion Collision Experiments</b> Organisers: A. Bazavov ( <i>Michigan State University</i> ), M. D'Elia ( <i>University of Pisa</i> ), M. Nahrgang ( <i>Subatech and École des Mines Nantes</i> )
28-30 June	<b>Simulating QCD on Lefschetz Thimbles</b> Organisers: C. Schmidt ( <i>University of Bielefeld</i> ), A. Alexandru ( <i>George Washington University</i> ), P. Bedaque ( <i>University of Maryland</i> )		
3-21 July	<b>TALENT School: Nuclear Theory for Nuclear Structure Experiments</b> Organisers: A. Brown ( <i>Michigan State University</i> ), M. Hjorth-Jensen ( <i>Michigan State University</i> ), A. Gade ( <i>Michigan State University</i> ), R. Grzywacz ( <i>University of Tennessee and Oak Ridge National Laboratory</i> ), G. Jansen ( <i>Oak Ridge National Laboratory</i> )		

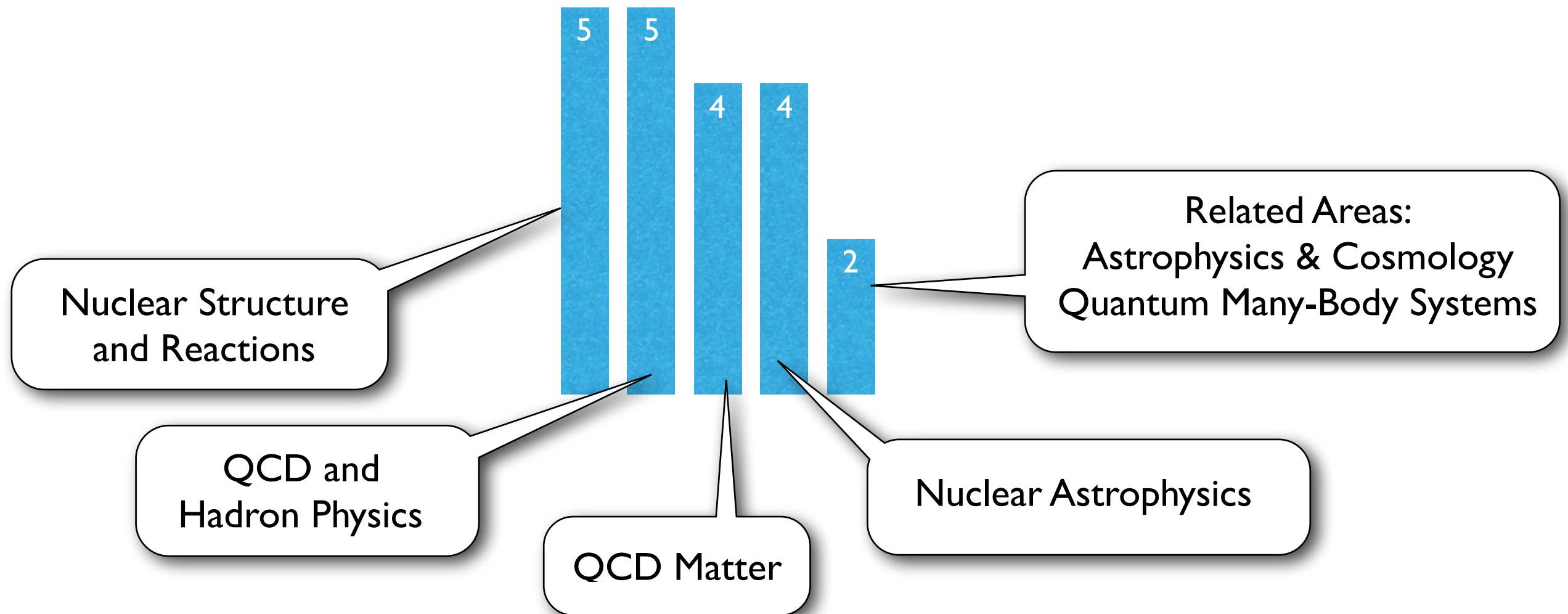




# ECT\* Scientific Events 2017

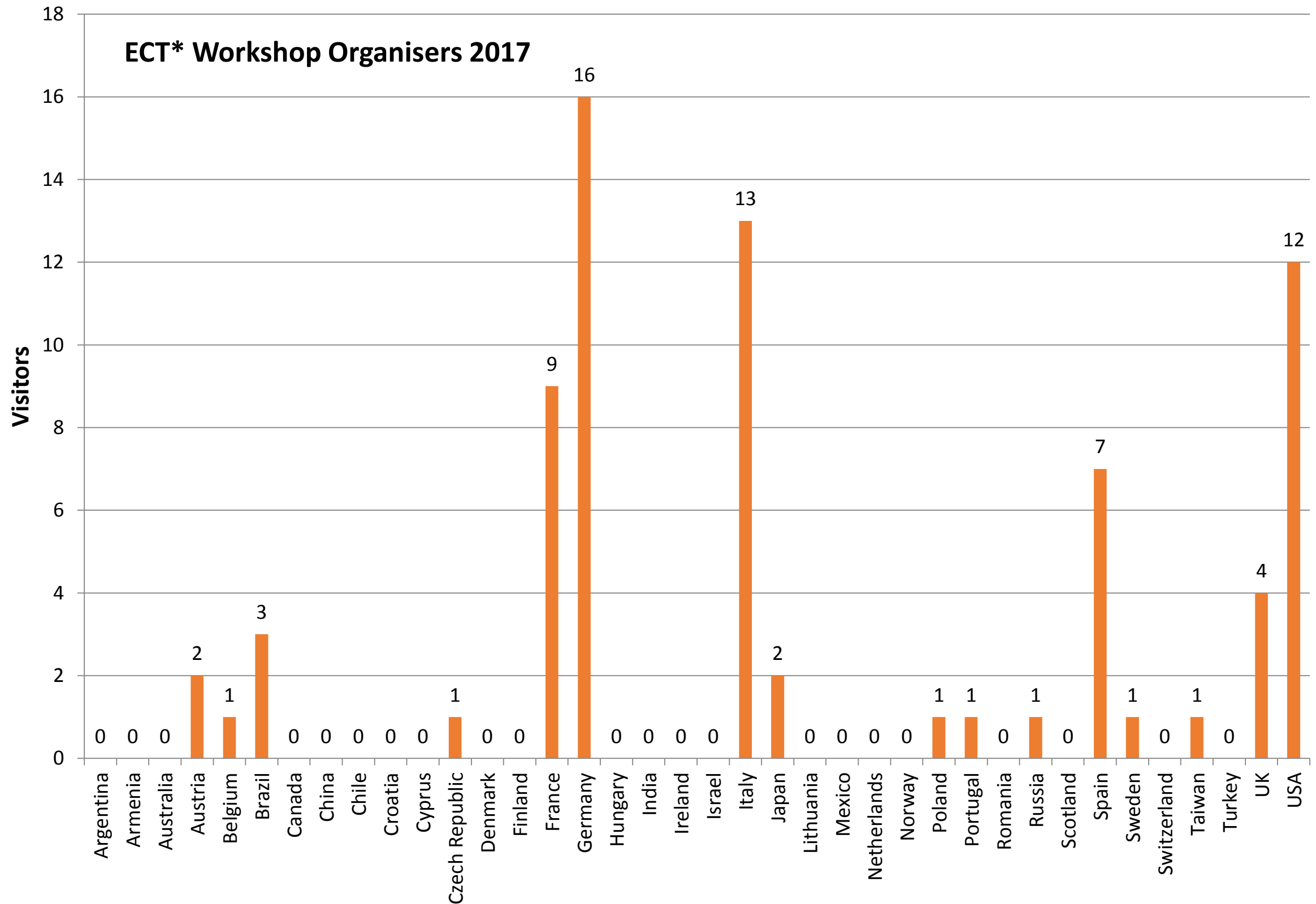


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# ECT\* Scientific Events 2017





# ECT\* Scientific Events 2017



## ECT\* Doctoral Training Programme 2017

Trento, June 12-30

### Microscopic Theories of Nuclear Structure, Dynamics and Electroweak Currents

Programme Coordinator

Omar Benhar (INFN and Università La Sapienza)

Students' Coordinator and Advisor

Georges Ripka (Saclay and ECT\*)

#### Lecturers and topics

Carlo Barbieri (*University of Surrey, UK*)

Omar Benhar (*INFN and Università La Sapienza, Italy*)

Evgeny Epelbaum (*Ruhr-Universität Bochum, Germany*)

Stefano Gandolfi (*Los Alamos National Laboratory, USA*)

Luca Girlanda (*Università del Salento, Italy*)

Alessandro Lovato (*Argonne National Laboratory, USA*)

Robert Roth (*Technische Universität Darmstadt, Germany*)

Rocco Schiavilla (*Jefferson Lab. and Old Dominion University, USA*)

Self-Consistent Green's Function Approach

Electron Scattering Studies of Nuclear Structure

Nuclear Dynamics from Chiral EFT

Quantum Monte Carlo Approach

Nuclear Electroweak Current within Chiral EFT

Correlated Basis Function Approach

No-Core Shell Model Approach

Phenomenological Nuclear Interactions and Currents



# ECT\* Scientific Events 2017



## ECT\* Nuclear TALENT School 2017

Trento, July 3-21

### Theory for Exploring Nuclear Structure Experiments

#### Organizers

Alex B. Brown (*Michigan State University*) - Morten Hjorth-Jensen (*Michigan State University and University of Oslo*)

#### Students' Coordinator and Advisor

Morten Hjorth-Jensen (*Michigan State University and University of Oslo*)

#### Topics

Basic elements of nuclear many-body physics

Nuclear forces and effective interactions

The nuclear shell model

Nuclear structure experiments and nuclear many-body theory

#### Lecturers

Alex B. Brown (*Michigan State University, USA*), Alexandra Gade (*Michigan State University, USA*),

Robert Grzywacz (*University of Tennessee and Oak Ridge National Laboratory, USA*),

Morten Hjorth-Jensen (*Michigan State University, USA and University of Oslo, Norway*),

Gustav R. Jansen (*Oak Ridge National Laboratory, USA*)





# Research @ ECT\*

## 2017



## Senior Researchers

Daniele **Binosi** (SRA - Italy)

Gauge Field Theories, QCD

Dionysis **Triantafyllopoulos** (SRA - Greece)

QCD, Collider Physics

## Junior Postdocs

Jesus **Casal Berbel** (PD - Spain)

Low Energy Nuclear Theory

Guillaume **Beuf** (PD - France)

QCD, Collider Physics

Maria **Gomez Rocha** (PD - Spain)

Hadron Physics, Quarkonia

Chen **Ji** (PD - China) (ECT\*/TIFPA)

Nuclear Few-body Theories, Cold Atoms

Arno **Tripolt** (PD - Germany)

Finite T Field Theory, Hot Matter

Arianna **Carbone** (PD - Spain) from Oct. 1, 2017

Nuclear Many-Body Theory

Naoto **Tanji** (PD - Japan) from Sept. 1, 2017

Partonic Transport, Photons

# INTERNATIONAL COOPERATIONS



INSTITUTE for NUCLEAR THEORY



Japan



National Astronomical Observatory of Japan



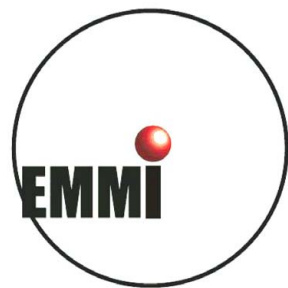
Korea

USA



JINR Dubna

Russia



Germany



China

ITP Chinese Academy of Sciences



# Budget 2017





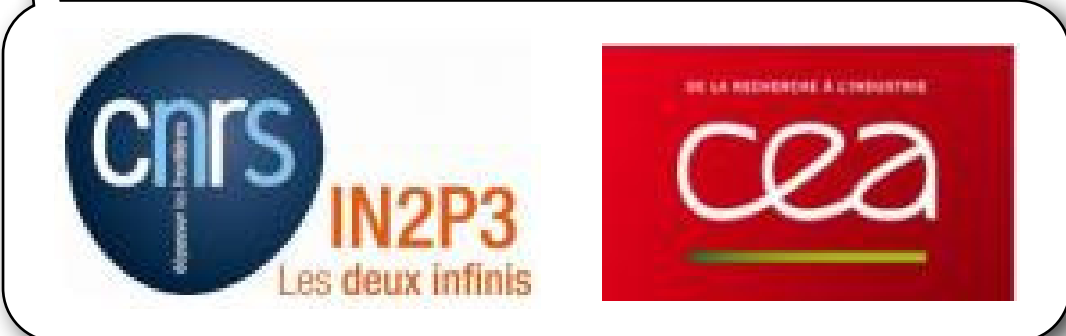
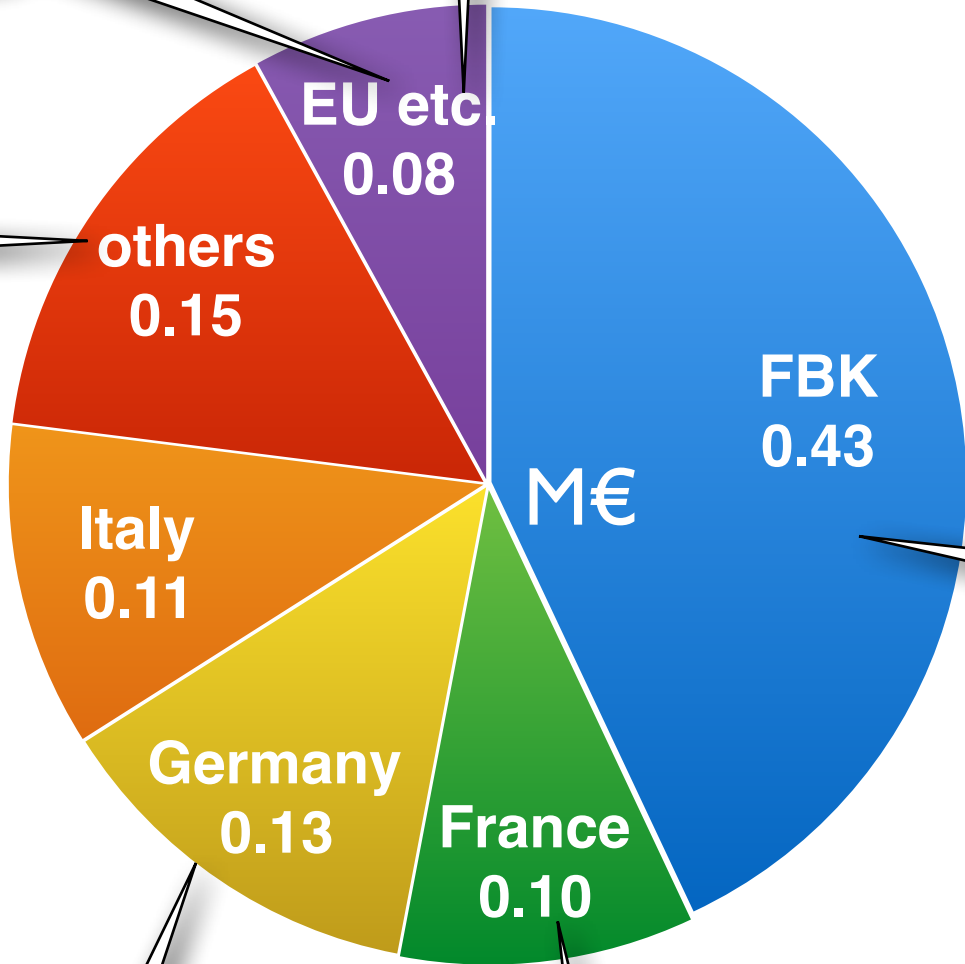
# ENSAR<sup>2</sup>

**Self-supported activities**

**Annual Running Budget 2017**  
(tentative)

**total: 0.97 M€**

**Belgium, Czech Republic, Finland, Hungary, the Netherlands, Poland, Romania, Russia, UK, USA + others**





## Contributions from European Funding Agencies and Institutions 2017



- Based on MoU signed by EJFRC (ECT\* Joint Finance Review Committee) and Protocols of Agreement (Oct. 2014) with contributing countries

<b>Contributions of European Funding Agencies and Institutions 2017</b>			
COUNTRY	PAYMENT REQUEST SENT	CONTRIBUTION ASKED FOR	RECEIVED ON
Belgium FWO (Flemish)		10,000	3/23/17
Belgium FNRS		10,000	4/3/17
Czech Republic		10,000	
Finland		8,000	5/3/17
France CEA (Saclay)		35,000	5/17/17
France CNRS		65,000	4/28/17
Germany		100,000	9/11/15
Hungary		2,000	
Italy (INFN)*		110,000	3/21/17
Netherlands		8,000	
Poland		10,000	
Romania		6,000	
Russia		20,000	
UK		26,000	
Received so far:		338,000	
<b>Total (expected):</b>		<b>€ 420,000</b>	

+ 100k + extra contribution INFN 10k



# Budget Status 2017

(comments)



- **FBK** contribution to ECT\* at **420** k€ in 2017 and 2018
  - **Russian** contribution (Dubna) to ECT\* at **20** k€ for 5 years
  - Additional indirect **INFN** contribution (**TIFPA postdoc**) to ECT\* in 2017
  - EU projects: **ECT\*** as **TNA** (Transnational Access) Facility:
    - **ENSAR2** (ECT\*: 229 k€ for 4 years) - **started March 1, 2016**
    - **HadronPhysicsHorizon** - **targeted application rejected** by the EU on Aug. 26, 2016  
**new application in 2018**
- 
- **No** contributions from **Denmark, Norway** and **Sweden** (i.e. **Finland** remains the **only** Nordic country contributing to ECT\*)
  - **No** contributions from **Austria, Greece, Portugal, Spain, Switzerland**