European Centre for Theoretical Studies in Nuclear Physics and Related Areas

OVERVIEW

Jochen Wambach
ECT* & TUDa

ECT*

FONDAZIONE BRUNO KESSLER

Established in 1993 …
… unique in **Europe**

25th anniversary!

- "Bottom-up" realization supported by large community
  → ECT* **Associates**

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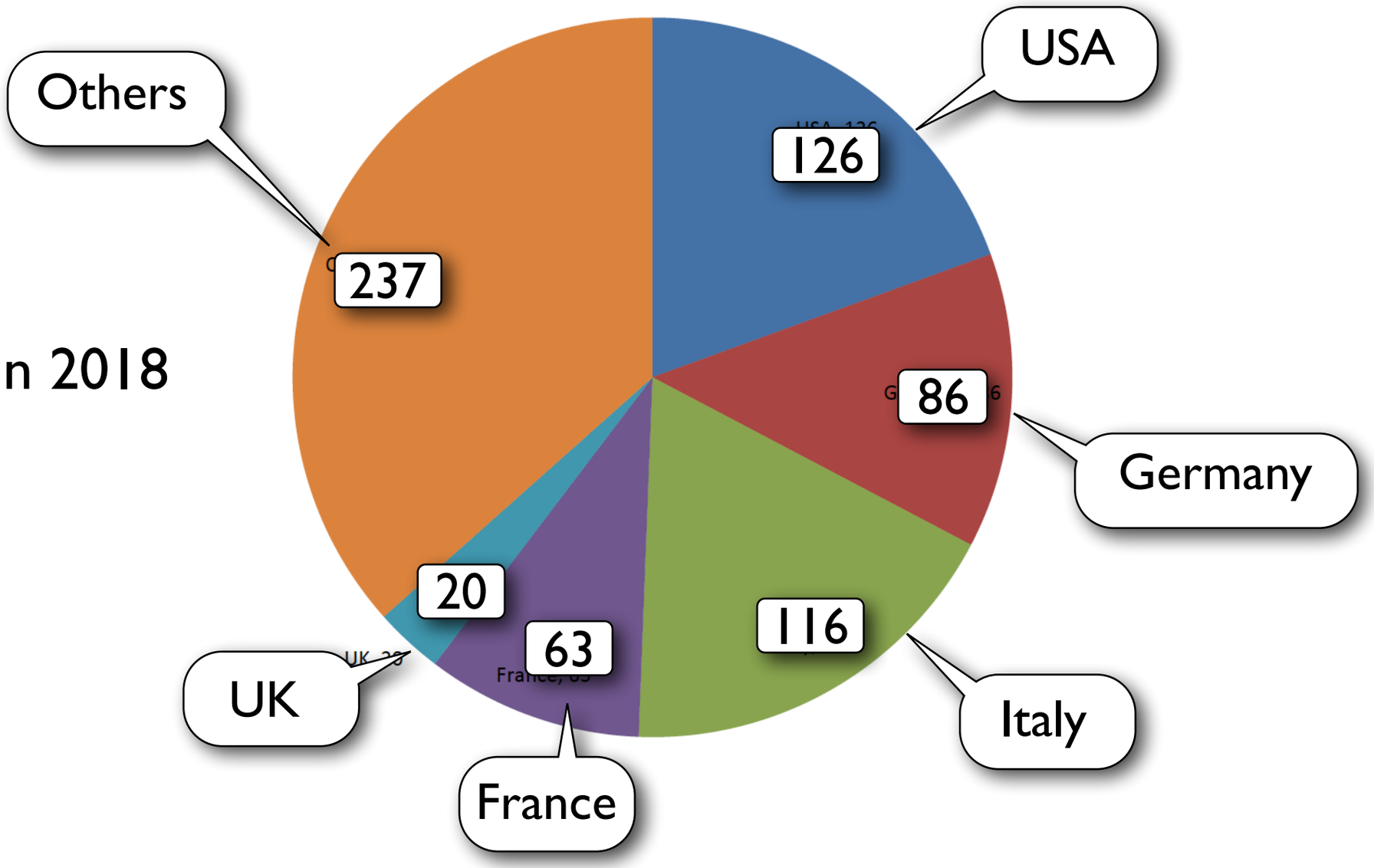
644 in 2018



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Gert **Aarts** (chair)	Univ. Swansea
Omar **Benhar**	INFN Rome
Marcella **Grasso**	CNRS - INP Orsay
Nicole **d'Hose**	CEA, Saclay
Morten **Hjorth-Jensen**	Univ. Oslo & Michigan State Univ.
Marek **Lewitowicz** (NuPECC)	GANIL, Caen
Dirk **Rischke**	Univ. Frankfurt
Martin **Savage**	INT & Univ. Washington, Seattle
Marc **Vanderhaeghen**	Univ. Mainz

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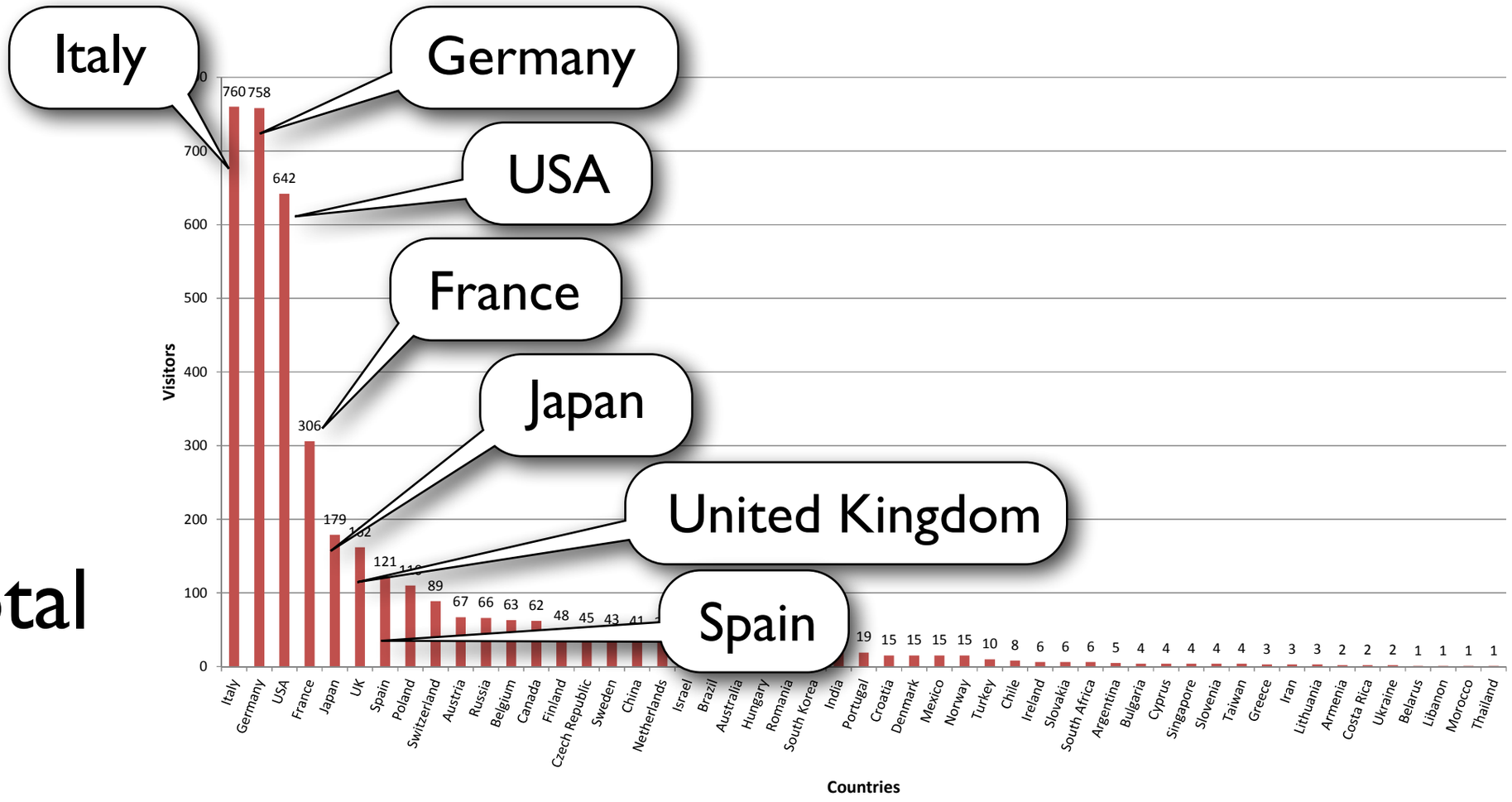
3904 total



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

FONDAZIONE
BRUNO KESSLER

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

ECT* at a glance

The ECT* Mission

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

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

Scientific activities at ECT*

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

ECT* Scientific Events 2018

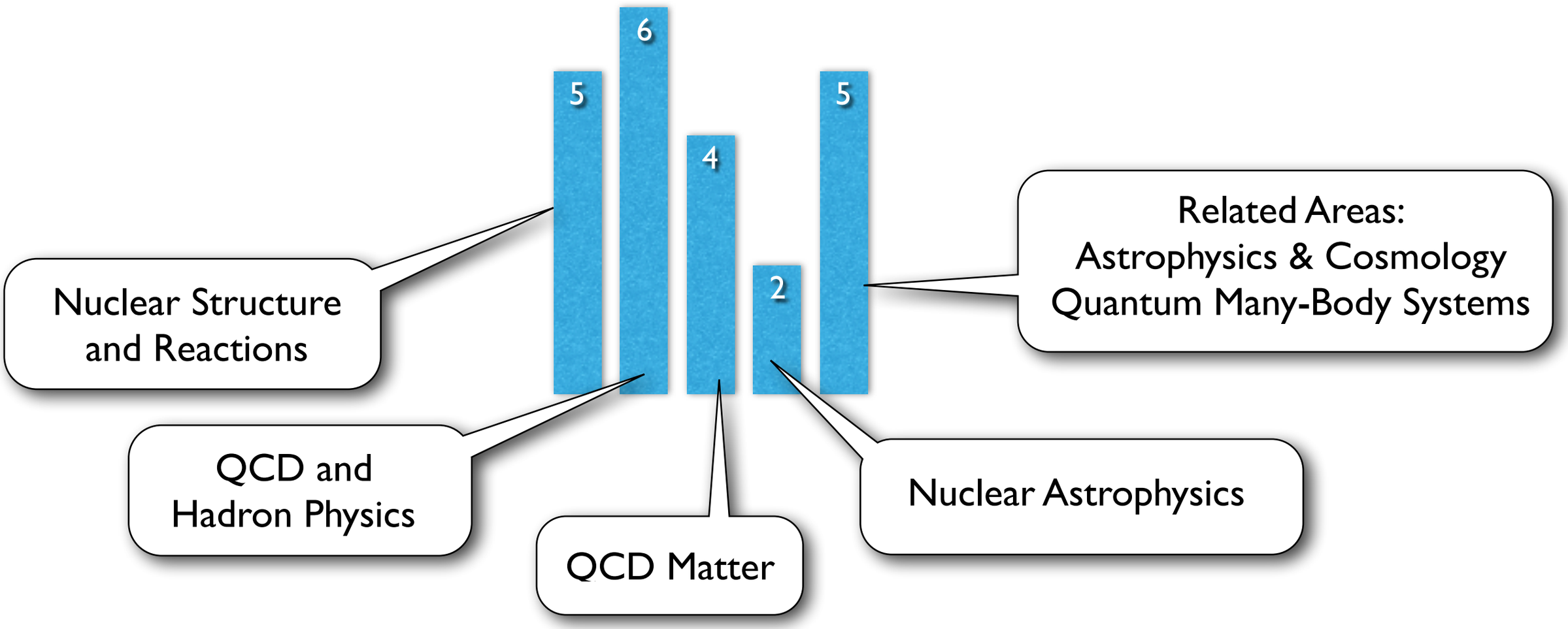
22 accepted workshops

2018 PROGRAMME OF ACTIVITIES

05-09 March	**Recent Advances and Challenges in the Description of Nuclear Reactions at the Limit of Stability** Organisers: P. Capel (*Université Libre de Bruxelles*), A. M. Moro (*University of Sevilla*), J. Casal (*ECT*, Trento*), J. A. Lay (*University of Sevilla*)
26-30 March	**Determination of the Absolute Electron (Anti)-Neutrino Mass** Organisers: K. Valerius (*KIT, Karlsruhe*), L. Gastaldo (*Heidelberg University*)
09-13 April	**Spontaneous and Induced Fission of Very Heavy and Super-Heavy Nuclei** Organisers: E. Vardaci (*University of Napoli*), N. Carjan (*JINR, Dubna, NIPNE-HH, Bucarest*), Y. Oganessian (*JINR, Dubna*)
16-20 April	**Exposing Novel Quark and Gluon Effects in Nuclei** Organisers: I. Cloët (*ANL, Lemont*), R. Dupré (*CNRS-IN2P3, Orsay*), S. Riordan (*ANL, Lemont*)
23-27 April	**Exploring the Role of Electro-Weak Currents in Atomic Nuclei** Organisers: S. Gandolfi (*LANL, Los Alamos*), R. F. Garcia Ruiz (*University of Manchester*), G. Hagen (*ORNL, University of Tennessee*), J. Holt (*TRIUMF, Vancouver*), A. Obertelli (*CEA, Paris-Saclay*)
07-11 May	**Foundational Aspects of Relativistic Hydrodynamics** Organisers: G. Moore (*TU Darmstadt*), M. Heller (*MPI for Gravitational Physics*), U. Heinz (*Ohio State University*)
21-25 May	**Probing QCD at the High Energy Frontier** Organisers: G. Beuf (*University of Jyväskylä*), N. Armesto (*University of Santiago de Compostela*), T. Lappi (*University of Jyväskylä*), C. Marquet (*École Polytechnique, Palaiseau*)
28 May - 01 June	**Gauge Topology 3: from Lattice to Colliders** Organisers: M. D'Elia (*University of Pisa*), E. Shuryak (*Stony Brook University*)
28 May - 22 June	**Doctoral Training Programme:** **QCD Under Extreme Conditions** Organisers: G. Aarts (*Swansea University*), D. Rischke (*Goethe University Frankfurt*)
04-08 June	**New Ideas in Constraining Nuclear Forces** Organisers: J. Lynn (*TU Darmstadt*), I. Tews (*INT, University of Washington*), J. Holt (*TRIUMF, Vancouver*), A. Ekström (*Chalmers University of Technology*)
18-22 June	**Exploring Nuclear Physics with Ultracold Atoms** Organisers: A. Gezerlis (*University of Guelph*), T. Enss (*Heidelberg University*), J. Thywissen (*University of Toronto*)
02-06 July	**Nucleon Spin Structure at Low Q: A Hyperfine View** Organisers: A. Deur (*JLab, Newport News*), A. Antognini (*ETH Zürich; Paul Scherrer Institute*), J. P. Chen (*JLab, Newport News*), V. Pascalutsa (*University of Mainz, PRISMA*), M. Vanderhaeghen (*University of Mainz, PRISMA*)
09-13 July	**Modeling Neutrino-Nucleus Interactions** Organisers: F. Sanchez (*Barcelona Institute of Science and Technology*), U. Mosel (*Giessen University*), M. Barbaro (*Turin University*), N. Jachowicz (*Ghent University*), D. Harris (*FNAL*)
16-20 July	**Probing Exotic Structure of Short-lived Nuclei by Electron Scattering** Organisers: T. Suda (*Tohoku University*), H. Simon (*GSI, Darmstadt*), T. Otsuka (*RIKEN, Wako*), C. Barbieri (*University of Surrey*)
03-07 September	**Quantum Gravity meet: Lattice QFT** Organisers: A. Schäfer (*Regensburg University*), N. Bodendorfer (*Regensburg University*), K. Giesel (*University of Erlangen*), M. Hanada (*Kyoto University, Livermore, Stanford University*), M. Panero (*Turin University*), Y. Laffe (*Seattle University*)
10-14 September	**Mapping Parton Distribution Amplitudes and Functions** Organisers: C. Mezrag (*INFN Roma*), G. Bali (*University of Regensburg*), C. Keppel (*JLab, Newport News*), C. Roberts (*ANL, Lemont*)
17-21 September	**Emergent Mass and its Consequences in the Standard Model** Organisers: D. Binosi (*ECT*, Trento*), A. Aguilar (*University of Campinas*), J. Papavassiliou (*University of Valencia*), C. Roberts (*ANL, Lemont*)
01-05 October	**Interdisciplinary Approach to QCD-like Composite Dark Matter** Organisers: M. Chala, (*University of Valencia, CSIC*), G. Nardini (*University of Bern*), M. Ramsey-Musolf (*University of Massachusetts Amherst, Kellogg Radiation Laboratory, CALTEC*), V. Sanz (*University of Sussex*), D. Schaich (*University of Bern*)
08-12 October	**Discrete Symmetries in Particle, Nuclear and Atomic Physics and implications for our Universe** Organisers: P. Moskal (*Jagiellonian University, Krakow*), D. Budker (*University of Mainz, HIM, University of California, Berkeley*), C. Curceanu (*LNF-INFN, Frascati*), D. Kimball (*California State University*), A. Kupsc (*Uppsala University*)
22-26 October	**Observables of Hadronization and the QCD Phase Diagram in the Cross-over Domain** Organisers: R. Stock (*Goethe University Frankfurt, FIAS*), M. Bleicher (*Goethe University Frankfurt, FIAS*), R. Bellwied (*University of Houston*), F. Becattini (*University of Florence, INFN*), J. Stachel (*Heidelberg University*), J. Stainhaimer (*FIAS, Frankfurt*)
05-09 November	**Indirect Methods in Nuclear Astrophysics** Organisers: L. Trache (*IFIN-HH Bucharest*), A. Bonaccorso (*INFN Pisa*), C. Bertulani (*Texas A&M University-Commerce*), T. Motobayashi (*RIKEN, Wako*) Z. Fulop (*MTA ATOMKI, Debrecen*)
26-30 November	**Electromagnetic Radiation from Hot and Dense Hadronic Matter** Organisers: G. David (*Stony Brook University*), C. Gale (*McGill University*)
19-21 December	**The Spectroscopy Program at EIC and Future Accelerators** Organisers: A. Pilloni (*Jlab, Newport News*), M. Battaglieri (*INFN Genova*), A. Szczepaniak (*Indiana University, JLab, Newport News*)

ECT* Scientific Events 2018

distribution of topics



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- **Doctoral training** programs and **Talent schools** (4-6 weeks of lectures for advanced PhD students)

The ECT* Doctoral Training Program

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


Alcuni argomenti di ricerca all'ECT*

Doctoral Training Programs & Schools

2013 - 2018

- 2013: Neutron-rich matter: Constraints from nuclear astrophysics (22 students)
- 2014: Heavy-ion collisions: Exploring nuclear matter under extreme conditions (35 students)

  TALENT: Density functional theory and self-consistent methods (25 students)
- 2015: Computational nuclear physics: Hadrons, nuclei and dense matter (17 students)

  TALENT: Few-body methods and nuclear reactions (29 students)
- 2016: Nuclear, neutrino and relativistic astrophysics (14 students)
- 2017: Microscopic theories of nuclear structure, dynamics and electroweak currents (25 students)

  TALENT: Theory of exploring nuclear structure experiments (31 students)
- 2018: QCD under extreme conditions (39 students)

ECT* Scientific Events 2018

ECT* Doctoral Training Programme 2018

Trento, May 28 - June 22

QCD under extreme conditions

Programme Coordinators

Gert Aarts (Swansea University)
Dirk Rischke (Johann Wolfgang Goethe-Universität Frankfurt)

Students' Coordinator and Advisor

Georges Ripka (Saclay and ECT*)

Lecturers and topics

Aleksi Vuorinen (*University of Helsinki, Finland*)	Thermal field theory
Dirk Rischke (*J. W. Goethe-Universität Frankfurt, Germany*)	Symmetries in quantum mechanics and particle physics
Claudia Ratti (*University of Houston, USA*)	QCD thermodynamics
Gert Aarts (*Swansea University, UK*)	Sign problem at nonzero density
Jan M Pawlowski (*Universität Heidelberg, Germany*)	Functional renormalisation group
Andreas Schmitt (*University of Southampton, UK*)	Dense matter
Tuomas Lappi (*University of Jyväskylä, Finland*)	Early stages of heavy-ion collisions
Ulrich Heinz (*Ohio State University, USA*)	Hydrodynamical description of heavy-ion collisions

Applications

Applications for the ECT* Doctoral Training Programme should be made electronically through the ECT* web 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 candidate's supervisor should be sent to:
Professor Jochen Wambach - Director of ECT (email to Serena degli Avancini serenada@ectstar.eu, fax: +39 0461 314 747)*

Deadline for applications: March 30, 2018

For further details see www.ectstar.eu

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  (8-10 junior postdocs & senior researchers)

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research topics

QCD and **Hadron physics, QCD matter,**
Nuclear structure and **reactions,**
Neutrons stars, Many-body theory,
Computational physics

Research @ ECT*

Senior Researchers

Daniele **Binosi** (SRA - Italy)	Gauge Field Theories, QCD
Dionysis **Triantafyllopoulos** (SRA - Greece)	QCD, Collider Physics
N.N. (Senior Postdoc)	Quantum Simulators for Relativistic Systems
N.N. (ECT*/TIFPA Senior Postdoc 3 years)	Neutron-star Mergers

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Junior Postdocs

Jesus **Casal Berbel** (PD - Spain)	Low-energy Nuclear Theory
Minghui **Ding** (PD - China)	Hadron physics, Meson structure functions
Naoto **Tanji** (PD - Japan)	Heavy-ion Collisions
Arianna **Carbone** (PD - Spain) Oct. 15	Nuclear Many-body theory, Neutron Stars
Arno **Tripolt** (PD - Germany)	Finite T Field Theory, Hot Matter
N.N. (ECT*/TIFPA)	Nuclear Many-body Theory

ECT* - LISC

Laboratorio Interdisciplinare di Scienza Computazionale

- Since January 2015:
  Interdisciplinary Laboratory for Computational Science of FBK
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- Series of **Joint ECT* - LISC Seminars**

Collaborations

INTERNATIONAL COOPERATIONS

NuPECC

INSTITUTE for NUCLEAR THEORY

Theory Alliance
FACILITY FOR RARE ISOTOPE BEAMS

USA

JINR Dubna

Russia

CRC-TR 211
Strong-interaction matter under extreme conditions

Germany

ECT*

FONDAZIONE BRUNO KESSLER

EMMI

TECHNISCHE UNIVERSITÄT DARMSTADT

RIKEN

Japan

National Astronomical Observatory of Japan

NAOJ

APCTP
Asia Pacific Center for Theoretical Physics

Korea

ITP
Chinese Academy of Sciences

China

Budget

ENSAR2

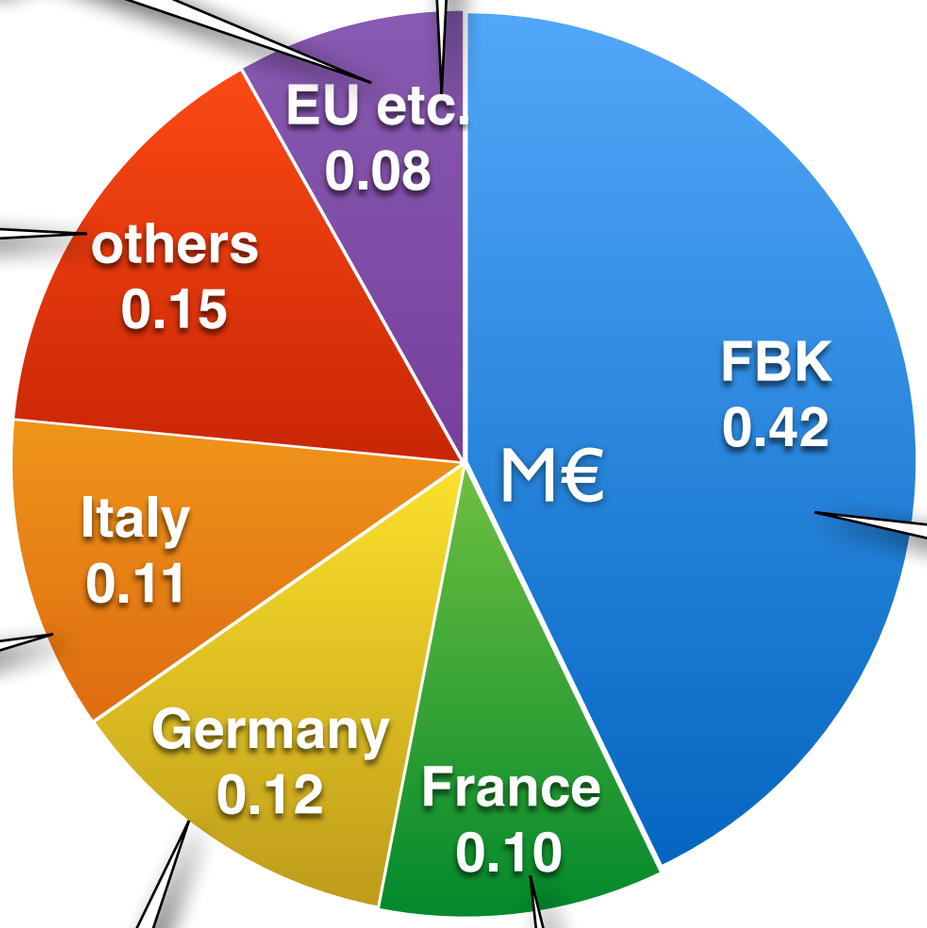
ECT*

Annual Running Budget 2018
(tentative)

total: 0.97 M€

Self-supported activities

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



INFN

FONDAZIONE BRUNO KESSLER

Bundesministerium für Bildung und Forschung

EMMI

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

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EUSTIPEN

Europe-U.S. Theory Institute for Physics with Exotic Nuclei

Mission

The Europe-U.S. Theory Institute for Physics with Exotic Nuclei (EUSTIPEN) has been established in order to facilitate collaborations between U.S.-based and Europe-based scientists whose main research thrust is in the area of the physics of nuclei. U.S. participation in EUSTIPEN is in the form of **travel grants** and **subsistence grants to ECT*** in Trento to those individuals who are interested in collaborating with European scientists. EUSTIPEN's purview is in the area of physics of or with **exotic nuclei,** including **nuclear structure** and **reaction theory**, **nuclear astrophysics**, and **tests of the standard model using exotic nuclei**. Funding for EUSTIPEN is being provided through the FRIB Theory Alliance by the Office of Nuclear Physics of the U. S. Department of Energy.

20 K$ annually

Steering Committee:

Baha Balantekin (Wisconsin, FRIB)
Charlotte Elster (Ohio, FRIB)
Muhsin Harakeh (Groningen, ENSAR2)
Augusto Macchiavelli (Livermore, FRIB)
Witek Nazarewicz (Michigan, FRIB)
Jorge Piekarewicz (Tallahassee, FRIB)
Jochen Wambach (Trento, ECT*)

European **C**entre for **T**heoretical Studies
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Thanks for your attention!

Jochen Wambach
ECT* & TUDa

ECT*

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