



# ECT\* update



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Gert Aarts

# ECT\* mission



- ✓ to be a Centre at the frontline of research in theoretical nuclear physics
- ✓ to promote active contacts between theory and experiments, and to related areas of research
- ✓ to further the training of young researchers
- established in 1993
- Institutional member of ESF-Expert Committee NuPECC (Nuclear Physics European Collaboration Committee)
- community-driven, bottom-up approach

# ECT\* Scientific Board

membership suggested  
by ECT\* associates  
3-year term

[Almudena Arcones](#) | TU Darmstadt (D)

[Constantia Alexandrou](#) | The Cyprus Institute (CY)

[Carlo Barbieri](#) | University of Milan (I)

[Anna Corsi](#) | IRFU/DPhN (F)

[David Kaplan](#) | University of Washington (USA)

[Denis Lacroix](#) | CNRS/IN2P3 (F)

[Marek Lewitowicz](#) | NuPECC/GANIL (F)

[Barbara Pasquini](#) | University of Pavia (I)

[Urs Wiedemann](#), Board Chair | CERN-TH (CH)

Ex officio: [Sandro Stringari](#) | University of Trento (I)

# Local Researchers (December 2022)

## ECT\* - Senior Researchers



DANIELE BINOSI  
ECT\* Senior Researcher  
☎ +39 0461 314738 @binosi@ectstar.eu

[VIEW PROFILE](#)



GIOVANNI GARBEROGLIO  
ECT\* Senior Researcher  
☎ +39 0461 314779 ☎ +39 0461 283918 @garberoglio@ectstar.eu

[VIEW PROFILE](#)



DIONYSIOS TRIANTAFYLLOPOULOS  
ECT\* Senior Researcher  
☎ +39 0461 314745 @trianta@ectstar.eu

[VIEW PROFILE](#)



MAURIZIO DAPOR  
ECT\* Senior Researcher  
☎ +39 0461 314752 @dapor@ectstar.eu

[VIEW PROFILE](#)



SIMONE TAIOLI  
ECT\* Senior Researcher  
☎ +39 0461 314732 @taioli@ectstar.eu

[VIEW PROFILE](#)

## ECT\* Fellows



BORYS HRYNIUK  
ECT\* Fellow

[VIEW PROFILE](#)

## ECT\* Postdocs



CONSTANTINOS CONSTANTINOU  
ECT\* Postdoc  
@cconstantinou@ectstar.eu

[VIEW PROFILE](#)



ACHILLE FIORE  
ECT\* Postdoc

[VIEW PROFILE](#)



ALEX GNECH  
ECT\* Postdoc

[VIEW PROFILE](#)



TOMMASO MORRESI  
ECT\* Postdoc

[VIEW PROFILE](#)



ZHAO-QIAN YAO  
ECT\* Postdoc

[VIEW PROFILE](#)

## ECT\* PhD students



LUIS BENJAMÍN RODRÍGUEZ AGUI  
ECT\* PhD student

[VIEW PROFILE](#)



FRANCESCO CARNOVALE  
ECT\* PhD student

[VIEW PROFILE](#)



GIOVANNI NOVI INVERARDI  
ECT\* PhD student

[VIEW PROFILE](#)



LUCA VESPUCCI  
ECT\* PhD student

[VIEW PROFILE](#)



# CALL FOR EXPRESSION OF INTEREST IN ECT\* VISITING SCIENTIST POSITIONS FOR UKRAINIAN RESEARCHERS



Call for Expression of Interest in ECT\* Visiting Scientist positions for Ukrainian researchers

## Who we are

The European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT\*) in Trento (Italy) is a Research Centre of the Fondazione Bruno Kessler (FBK). It provides a dedicated and structured combination of scientific activities for a large international scientific community in theoretical nuclear physics and related areas, in the broadest sense. ECT\* is registered as an European Research Infrastructure, and it is an institutional member of NuPECC, the ESF Associated Nuclear Physics European Collaboration Committee. It promotes coordination of European research efforts in nuclear physics and related research areas.

[www.ectstar.eu](http://www.ectstar.eu)

## Fellowships 2022

The activities of ECT\* also include a limited number of fellowships for senior and junior researchers in the area of research of the Centre. This year ECT\* offers 3 fellowships, that may last from 3 to 6 months, that are dedicated to Ukrainian researchers. Each fellowship provides a financial monthly contribution.

[direct link](#)

# Staff



MICHELA CHISTÈ

Staff

+39 0461 314723 @chiste@ectstar.eu

[VIEW PROFILE](#)



SUSAN MARIA DRIESSEN

Staff

+39 0461 314722 @driessen@ectstar.eu

[VIEW PROFILE](#)



BARBARA GAZZOLI

Staff

+39 0461 314763 @gazzoli@ectstar.eu

[VIEW PROFILE](#)

responsible for all the day-to-day work to keep ECT\* running

delivery of workshop and training programme

# 2021 Annual report

available on the ECT\* website



**31.1-4.2 Alpha S (2022): Workshop on Precision Measurements of the Strong Coupling Constant**  
D. ENTERRIA (CERN), S. KLUTH (MPP), G. ZANDERIGHI (MPP)

**11-15.4 Nuclear Physics from Atomic Spectroscopy (ONLINE)**  
L. PLATTER (University of Tennessee), R. GARCIA RUIZ (Massachusetts Institute of Technology), C. JI (Central China Normal University),  
S. PASTORE (Washington University)

ECT\* DOCTORAL TRAINING PROGRAM: Hadron Physics with Functional Methods  
R. ALKOFR (University of Graz), G. EICHMANN (LIP Lisboa),  
M. HUBER (Giessen University)

E. SHURYAK (Stony Brook University), M. D'ELIA (University of Pisa),  
J. GREENSITE (San Francisco State University), E. KIRITSIS (University of  
Crete), I. ZAHED (Stony Brook University)

**Connections Between Cold Atoms and Nuclear Matter:  
From Low to High Energies**  
C. SA DE MELO (Georgia Institute of Technology), A. GEZERLIS

J. MULLIGAN (UC Berkeley), Y.J. LEE (MIT), K. TYWONIUK (University of Bergen), L. CUNQUEIRO (Ecole Polytechnique), S. CAO (Shandong University)

L. TEWS (LANL, Los Alamos), B. GIACOMAZZO (University of Milano), S. GUILLOT (CNRS Toulouse), J. MARGUERON (IPN Lyon), S. NISSANKE (University of Amsterdam)

C. ROYON (Kansas University), A. SABIO VERA (Universidad Autónoma de Madrid), S. SCHLICHTING (University of Bielefeld), A. DESHPANDE (Stony Brook University), G. SOYEZ (IpiT, Saclay), M. HENTSCHINSKI (Universidad de Las Americas Puebla)

4-8.7 Nuclear Physics at the Edge of Stability\*  
G. HUPIN (IJClab), O. SORLIN (GANIL), A. GADE (MSU), L. PLATTER (UTK)

Y. BLUMENFELD (IJCLab), G. COLÒ (University of Milano and INFN), U. GARG (University of Notre Dame), E. KHAN (IJCLab), M. VANDEBROUCK (DPhN, CEA Saclay)

E. CLINE (Stony Brook University), A. AFANASEV (George Washington University), S. BARKANOVA (Memorial University of Newfoundland), J. BERNAUER (Stony Brook University), R. GILMAN (Rutgers University), H. SPIESBERGER (Johannes Gutenberg University of Mainz)

**25-29.7 Nuclear and Atomic Transitions as Laboratories for High Precision Tests of Quantum Gravity Inspired Models**  
A. MARCHIANO (Fudan University), S. ALEXANDER (Brown University, Providence), E. BARBERIO (Melbourne University), C. CURCEANU (INFN, Padova)

1-5.8 Neutron Electric Dipole Moment: from Theory to Experiment\*  
A. ATHENODOROU (Pisa University), D. GIATAGANAS (National and Kapodistrian University of Athens), B. LUCINI (Swansea University),  
E. RINALDI (Arithmer Inc., Tokyo), K. CRANMER (New York University),

G. CORCELLA (LNF-INFN), S. DE CURTIS (INFN Florence), S. MORETTI (University of Southampton), G. PANCHERI (LNF-INFN), R. TENCHINI (INFN Bologna), M. VOS (IFIC Valencia)

**5-9.9 From Hadrons to Therapy: Fundamental Physics Driving New Medical Advances**  
P. DE VERA GOMIS (Universidad de Murcia), M. DURANTE (GSI), C. HOEHR (TRIUMF), K. PARODI (Ludwig-Maximilians-Universität München), V. CONTE (LNL-INFN), J. KOHANOFF (Universidad Politécnica de Madrid), M. SCHWARZ (APSS, Trento), R. GARCIA-MOLINA (Universidad de Murcia)

**Spectra and Structure\***  
D. BINOSI (ECT\*), H. W. LIN (Michigan State University), T. HORN  
(Catholic University of America), C. ROBERTS (Nanjing University)

H. AVAGYAN (Jefferson Lab), J. ARRINGTON (LBL), A. BACCHETTA (Pavia University), O. HEN (MIT), X. JI (UMD), K. JOO (UConn), X. ZHENG (UVA)

**3-14.10 Reduced Density-Matrix Functional Theory: Improving its foundation and extending its scope**  
C. L. BENAVIDES-RIVEROS (Max-Planck Institute for Complex Systems),  
E. K. U. GROSS (Hebrew University) and C. SCHILLING (LMU, Munich)

O. VAZQUEZ DOCE (LNF-INFN), C. CURCEANU (LNF-INFN),  
A. RAMOS (Universitat de Barcelona), J. ZMESKAL (SMI-Vienna),  
J. MAREŠ (Czech Academy of Sciences)

E. LITVINOVA (Western Michigan University), R. BROGLIA (Niels Bohr Institute), H. LENSKE (Justus-Liebig-Universität, Giessen)

7-11.11 Tomography of Light Nuclei at an EIC\*  
A. FREESE (University of Washington), W. COSYN (Ghent University & Florida International University), I. CLOËT (ANL), P. SHANAHAN (MIT)

12-16.12 Key Reactions in Nuclear Astrophysics\*  
A. TUMINO (University of Enna "Kore" & INFN-LNS, Catania), J. JOSÉ  
(Technical University of Catalonia), C. BERTULANI (Texas A&M  
University-Commerce), R. DIEHL (MPI Munich), L. TRACHE (IFIN-HH Bucurest-  
Magurele, Romania)

\*STRONG-2020 supported workshop

All workshops will run in hybrid mode, provided that the pandemic situation permits this.

The ECT\* is part of the Bruno Kessler Foundation. The Centre is funded by the Autonomous Province of Trento, funding agencies of EU Member and Associated States, INFN-TIFPA, and has the support of the Department of Physics of the University of Trento. The Director of the ECT\* is Prof. Gert Aarts (Trento and Swansea University)

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# 2022 Activities

(almost) all meetings were hybrid

visitor programme restarted

one workshop remaining:

## Key Reactions in Nuclear Astrophysics

12-16 December 2022



# DTP 2022



## Hadron Physics with Functional Methods

Doctoral Training Programme 2022

Trento, 2-20 May 2022

### LECTURERS AND TOPICS

*Ian Cloet*, Argonne National Laboratory  
**Hadron structure at the EIC**

*Christian S. Fischer*, Giessen University  
**Functional methods**

*Astrid N. Hiller Blin*, Thomas Jefferson  
National Accelerator Facility  
**Amplitude analysis and  
electroproduction experiments**

*Pieter Maris*, Iowa State University  
**Dyson-Schwinger and Bethe-Salpeter  
equations**

*Jan M. Pawłowski*, University of  
Heidelberg  
**Functional renormalization group**

*Elena Santopinto*, INFN Sezione  
di Genova  
**Quark models**

*Alessandro Pilloni*, INFN Sezione  
di Roma  
**Exotic hadron spectroscopy**

### PROGRAMME COORDINATORS

*Reinhard Alkofer*, University of Graz  
*Gernot Eichmann*, LIP Lisboa  
*Markus Huber*, Giessen University

### STUDENT COORDINATOR AND ADVISOR

*Markus Huber*, Giessen University

### 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 applicants' personal motivation for participating in the Programme.

In addition, a reference letter from the candidate's supervisor should be sent to Barbara Gazzoli (gazzoli@ectstar.eu) for the attention of Professor Gert Aarts - Director of ECT\*. For further details see [www.ectstar.eu](http://www.ectstar.eu)

Registrations will be available from December 6, 2021 until February 28, 2022



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- programme selected by Scientific Board
- indico pages being finalised
- 24 workshops and collaboration meetings
- please check [website](#) for details
- 1 Doctoral Training Programme

# DTP 2023: Ab Initio Methods and Emerging Technologies for Nuclear Structure

- 10-28 July 2023

organizers:

- Carlo Barbieri (University of Milan, INFN)
- Alessandro Roggero (University of Trento)

registration:

- from 13/02/2023 until 15/05/2023
- please advertise to your students!

# DTP 2023: Ab Initio Methods and Emerging Technologies for Nuclear Structure

The DTP will focus on **ab initio nuclear theory**, with emphasis on **modern computational methods and emerging technologies**. The past decade has seen considerable progress in this field, leading to fully fledged computations with three-nucleon forces in medium mass isotopes. High-performance computing is now pivotal to the quest for reaching predictions of complex and heavy isotopes. Future frontiers will exploit **Machine Learning** and **Quantum Computing** algorithms as **tools for many-body nuclear physics**.

The aim of the DTP 2023 is to provide the participants with a **pedagogical introduction to many-body theories** that allow a deep understanding of nuclear structure, present the open challenges in relation to **modelling nuclear reactions and interaction with weak probes**, and providing know how for **implementation with high-performance and GPU computing**.



# From hybrid to the new(er) normal

- one of the aims of ECT\* is to stimulate scientific discussion in an informal and creative environment
- hence, ECT\* returns to in-person participation as the preferred way of interaction
- to build on the experiences gained during the pandemic and to support an inclusive global research community, presentations at workshops can be broadcast via zoom, if the workshop organisers choose to do so
- ECT\* expects organisers and speakers to be present in person (when possible)



# Funding and MoUs

Funding agencies and supporting institutions



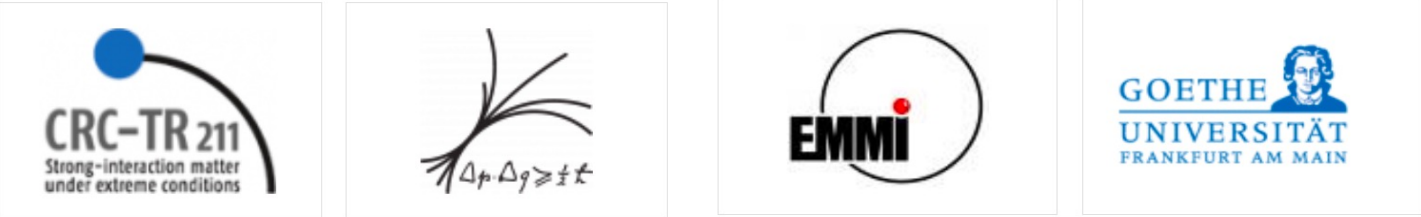
Funding

Local support

European networks



Additional contributors (Germany):



# EU funding

- ❖ essential contribution to ECT\* budget



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824093



# FRIB Theory Alliance EUSTIPEN Program

Europe-U.S. Theory Institute for Physics with Exotic Nuclei (EUSTIPEN):

- facilitate collaborations between U.S.-based and Europe-based scientists working on exotic nuclei, including nuclear structure and reaction theory, nuclear astrophysics, and tests of the standard model
- U.S. participation in EUSTIPEN: travel funds to ECT\* for collaboration
- funding for EUSTIPEN provided from the MSU FRIB Theory Alliance with financial assistance from the Office of Nuclear Physics of the U.S. DOE Office of Science.
- MoU renewed 01/09/2022

# 5-year external review/MoU renewal

- previous review in 2018, chair: Larry McLerran, INT
- new review in preparation, first half of 2023
- MoUs need to be renewed in 2023, for another 5-year period
- support from (European) community of researchers is very much appreciated (and needed!)



Questions/comments?

