

NEWSLETTER N.4, March 2019



The TEQ members and the appointed reviewers at the Research Executive Agency of the European Commission for the TEQ first Review Meeting, Brussels, 26th February 2019.

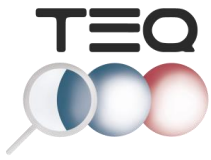


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UPDATES OF WORK DONE

Review Meeting

On February 26, 2019, the members of the TEQ Steering Committee met in Brussels at the Research Executive Agency of the European Commission for the Review Meeting concerning the project's first reporting period. The group had a one-day discussion chaired by the TEQ's EU Project Officer Roumen Borissov and 3 monitors assisting in the project assessment: Radim Pilip, Romain Quidant, Ward Struyve. Following the Review Meeting, the REA released the Review Report on March 18, 2019. As an overall assessment, this report underlines how "the project has fully achieved its objectives and milestones for the period" and how "the first experimental and theoretical results have been delivered." The evaluation of the work done is very good: "the scientific quality of the result is high as clearly documented by several papers published in high-profile journals. Very likely, they will have a sufficiently large impact on the scientific community of quantum physics, quantum optomechanics and fundamental physics." The report states that "there will likely be substantial impact on science and technology in the coming years". Particular merit was given to the TEQ's extensive dissemination and exploitation plan: "for the first year there was an excellent dissemination, in particular to non-experts, general public and students. There is a well-structured and clear website with the relevant information about TEQ".

PUBLICATIONS

(for more info, please go to www.tequantum.eu → 'Publications')

Here below, the new publications:

Authors	Title	Journal	Volume	Pages	Year
Guérin, Philippe Allard, Marius Krumm, Costantino Budroni, and Časlav Brukner	Composition rules for quantum processes: a no-go theorem	New Journal of Physics	21.1	012001	2019
Giacomini, Flaminia, Esteban Castro-Ruiz, and Časlav Brukner	Quantum mechanics and the covariance of physical laws in quantum reference frames	Nature Communications	10	494	2019
Timberlake, Chris, Marko Toroš, David Hempston, George Winstone, Muddassar	Static force characterization with Fano anti-resonance in levitated optomechanics	Appl. Phys. Lett.	14	023104	2019

Rashid, and Hendrik Ulbricht					
Çakmak, Barış, Steve Campbell, Bassano Vacchini, Özgür E. Müstecaplıoğlu, and Mauro Paternostro	Robust multipartite entanglement generation via a collision model	Phys. Rev. A	99	012319	2019

DISSEMINATION ACTIVITIES

(for more info, please go to www.tequantum.eu → 'Dissemination')

Here below, some of the dissemination activities of the first 2019 trimester:

- 1) C. Brukner, Quantum Causal Structures within "Workshop of the COST Action MP1405, Quantum Structure of Spacetime QSPACE", Bratislava, Slovakia, February 2019
- 2) C. Curceanu, Testing Quantum Mechanics Underground: a hunt of the "impossible" Radiation, Colloquium at Pavia University (Italy), 21 March 2019
- 3) C. Curceanu, I 7 più grandi Misteri della Fisica Moderna, public talk at Collegio Borromeo, Pavia, 21 March 2019
- 4) C. Curceanu, Le meraviglie quantistiche: dal gatto di Schroedinger al computer quantistico, talk at High School Sandro Pertini, Ladispoli, 14 March 2019
- 5) C. Curceanu, I 7 piu' grandi Misteri della Fisica Moderna, a series of 3 public talks at Frascati Library, Frascati (Roma), 4, 18 and 27 March 2019
- 6) C. Curceanu, Acceleratori: le meravigliose machine per conoscere l'Universo e per curare i tumori, High School Francesco D'Assisi, Roma, 5 March 2019
- 7) C. Curceanu, Introduzione alla meccanica quantistica e ai suoi paradossi, talk for hgh-school science teachers from Marche Region, Jesi, 1 March 2019
- 8) C. Curceanu, Universi da scoprire: dalla meccanica quantistica ai buchi neri, talk at High-School Leonardo da Vinci, Jesi, 1 March 2019
- 9) C. Curceanu, Dall'armonia delle sfere al Big Bang, Lecture within "Relatività, meccanica quantistica e cosmologia ", for the ATA – Associazione Tuscola di Astronomia Livio Gratton, 19 February 2019, ESA-ERSIN, Frascati
- 10) C. Curceanu, Introduzione alla meccanica quantistica e ai suoi paradossi (2), Lecture within "Relatività, meccanica quantistica e cosmologia ", for the ATA – Associazione Tuscola di Astronomia Livio Gratton, 12 February 2019, ESA-ERSIN, Frascati

- 11) C. Curceanu, Introduzione alla meccanica quantistica e ai suoi paradossi (1), Lecture within "Relatività, meccanica quantistica e cosmologia ", for the ATA – Associazione Tuscola di Astronomia Livio Gratton, 5 February 2019, ESA-ERSIN, Frascati
- 12) C. Curceanu, Sulle tracce del Piccolo Principe: alla ricerca degli esopianeti, lecture for primary school, Biblioteca di Colonna, 12 February 2019
- 13) C. Curceanu, Dalla Transilvania a Frascati fra particelle strane e gatti quantistici, at the International Day of Women and Girls in Science, LNF-INFN, 11 February 2019
- 14) C. Curceanu, I 7 piu' grandi Misteri della Fisica Moderna, public talk at Sala Pietro da Cemmo, Crema, 25 January 2019
- 15) C. Curceanu, Dal mondo Newtoniano alla Relatività Ristretta, Lecture within "Relatività, meccanica quantistica e cosmologia ", for the ATA – Associazione Tuscola di Astronomia Livio Gratton, 22 January 2019, ESA-ERSIN, Frascati

UPCOMING ACTIVITIES

TEQ Workshop

As stated in the TEQ project proposal (Annex 1 – part A), a workshop on *Redefining the foundations of physics in the quantum technology era* is to be organized within the year 2 of TEQ. Preparation of this workshop are undergoing as it will take place in September 2019, from 16 to 19, in Trieste. The workshop will explore the state of the art – both theoretically and experimentally – of the current understanding of quantum theory and discuss the new directions of research. The workshop will gather European and international experts in quantum mechanics. Speakers will include leading senior experts in quantum mechanics as well as junior members of the TEQ consortium.

The workshop website is: <http://tequantum.eu/?q=redefining-foundations/2019>

Trieste Junior Quantum Days

In the frame of TEQ, the second edition of the Trieste Junior Quantum Days will be organized in Trieste from July 24 to 26, 2019. The workshop will gather young researchers working in quantum mechanics and its applications. PhD students and PostDocs will be given the opportunity to present their research activity and interact with their colleagues, share motivations, techniques and perspectives, in a friendly and informal environment. In the morning, blackboard lectures by senior experts will provide a perspective on relevant problems in quantum theory.

The workshop website is: <http://tequantum.eu/?q=TriesteJuniorQuantumDays/2019>

Quantum Café

After the big success of the first edition in the fall 2018, UniTs organizes a new round of dissemination events in the frame of the TEQ project to communicate to the general public the beauty and the importance of quantum mechanics. This spring the Quantum Café takes place in 2 cities: Trieste and Udine.



CAFFÈ DEI QUANTI
 Scienza, musica, teatro: avvicinarsi alla meccanica quantistica
 UDINE Primavera 2019

Sull'onda dei quanti martedì 12 marzo 2019, ore 18:30
 Erwin Schrödinger, le fusa del paradosso
 La biografia dello scienziato
 I quanti: un mondo di strane sovrapposizioni e magiche correlazioni
 Fabio Benatti, Università di Trieste & INFN

Attrazioni fatali martedì 26 marzo 2019, ore 18:30
 Stephen Hawking, la passione per l'universo
 La biografia dello scienziato
 Gravitazione, teoria dei quanti e buchi neri
 Stefano Ansoldi, Università di Udine & INFN

Il computer che verrà martedì 9 aprile 2019, ore 18:30
 Richard Feynman, il ritmo della fisica
 La biografia dello scienziato
 Algoritmi, telecomunicazioni e crittografia: la rivoluzione quantistica
 Mauro Paternostro, Queen's University Belfast, UK

Letture e musiche sono a cura dell'Associazione **CORO UNIUD**

Caffè dei Libri
 via Poscolle 65
 Udine
 Per prenotazioni
 Tel: 0432 1482293
 Web: www.tequantum.eu
fb.me/caffedeiquanti

Il Caffè dei Quanti è parte del progetto TEQ, finanziato dalla Commissione Europea, iniziativa ideata da Angelo Bassi

UNIVERSITÀ DEGLI STUDI DI UDINE
 Dipartimento di Scienze Matematiche, Informatiche e Fisiche

UNIVERSITÀ DEGLI STUDI DI TRIESTE
 Dipartimento di Fisica

TEQ

EUROTECH
 Si ringrazia Eurotech per il sostegno all'evento artistico

In Udine, the Quantum Café, organized in close collaboration with the University of Udine, proposes a cycle of events along the lines of the first edition in Trieste offering talks on the basics of quantum mechanics by prof. Fabio Benatti (UniTs), Stefano Ansoldi (UniUd) and Prof. Mauro Paternostro (QUB). Thanks to the support of the company Eurotech, the UniUd choir performed the readings and the live music (*see Program on the left*). The first two appointments have been very well attended and received positive comments and feedbacks from the audience.

In Trieste, for its second edition, the Quantum Café proposes the topic of the Universe: the first event (March 20th – “Dark in the Universe”) offers an overview of the observed Universe, the distances, the black holes and the current astrophysical open issues; the second date (April 3rd – “Learn to look”) wants to give explanations about the instruments and the ways to observe the Universe; the third evening (April 17th – “In the beginning was the light”) instead explores the origins of the Universe and explains how quantum mechanics describes the first life instants of the Universe (*see Program below*).





With the aim of offering an interdisciplinary dissemination event that could bring other forms of experimentation closer to science and to the general public, the Quantum Cafè offers moments of theater readings of contemporary classics by the students of the University Theater Center (CUT) and live music performed by the students of the Trieste Tartini Conservatory.



CAFFÈ DEI QUANTI

scienza, musica, teatro: avvicinarsi alla meccanica quantistica
alla scoperta dell'universo

marzo_aprile 2019, ore 18.30

Caffè libreria Knulp
via Madonna del Mare 7/a, Trieste

per info e prenotazioni:
T. +39 040 300021



mercoledì 20 marzo
Il buio nell'universo

mercoledì 3 aprile
Imparare a guardare

mercoledì 17 aprile
In principio la luce

Le Cosmicomiche
di Italo Calvino

Letture a cura degli studenti
del Centro Universitario Teatrale - CUT Trieste

Il lato oscuro dell'Universo

Intervento scientifico di
STEFANO BORGANI
Dipartimento di Fisica, Università di Trieste

Musica

MATTEO CHIODINI chitarra
Conservatorio "G. Tartini" di Trieste

La Ginestra
di Giacomo Leopardi

Letture a cura degli studenti
del Centro Universitario Teatrale - CUT Trieste

**Come osservare l'Universo.
Dal cannocchiale di Galileo
ai telescopi giganti del futuro**

Intervento scientifico di
STEFANO CRISTIANI
Istituto Nazionale di Astrofisica - INAF Trieste

Musica

SIMONE LANZI contrabbasso
PIERCARLO FAVRO chitarra
KRISTINA IVANOVIĆ voce
Conservatorio "G. Tartini" di Trieste

La Biblioteca di Babele
di Jorge Luis Borges

Letture a cura degli studenti
del Centro Universitario Teatrale - CUT Trieste

**Prima del Big Bang:
l'universo inflazionario**

Intervento scientifico di
PAOLO CREMINELLI
International Centre for Theoretical Physics - ICTP
Trieste

Musica

ANDREA CORAZZA oboe
FEDERICO FORTI pianoforte
Conservatorio "G. Tartini" di Trieste

Il Caffè dei Quanti è un'iniziativa
sviluppata nell'ambito del progetto di ricerca
**TEO Testing the large-scale limit
of quantum mechanics**
finanziato dalla **Commissione Europea**
www.teoquantum.eu

Ideato e organizzato da
Angelo Bassi
Università di Trieste

Contatti
Università di Trieste
Dipartimento di Fisica
via Valerio 2, Trieste
T. +39 040 568 3399 / teo@units.it
fb.me/caffedequanti