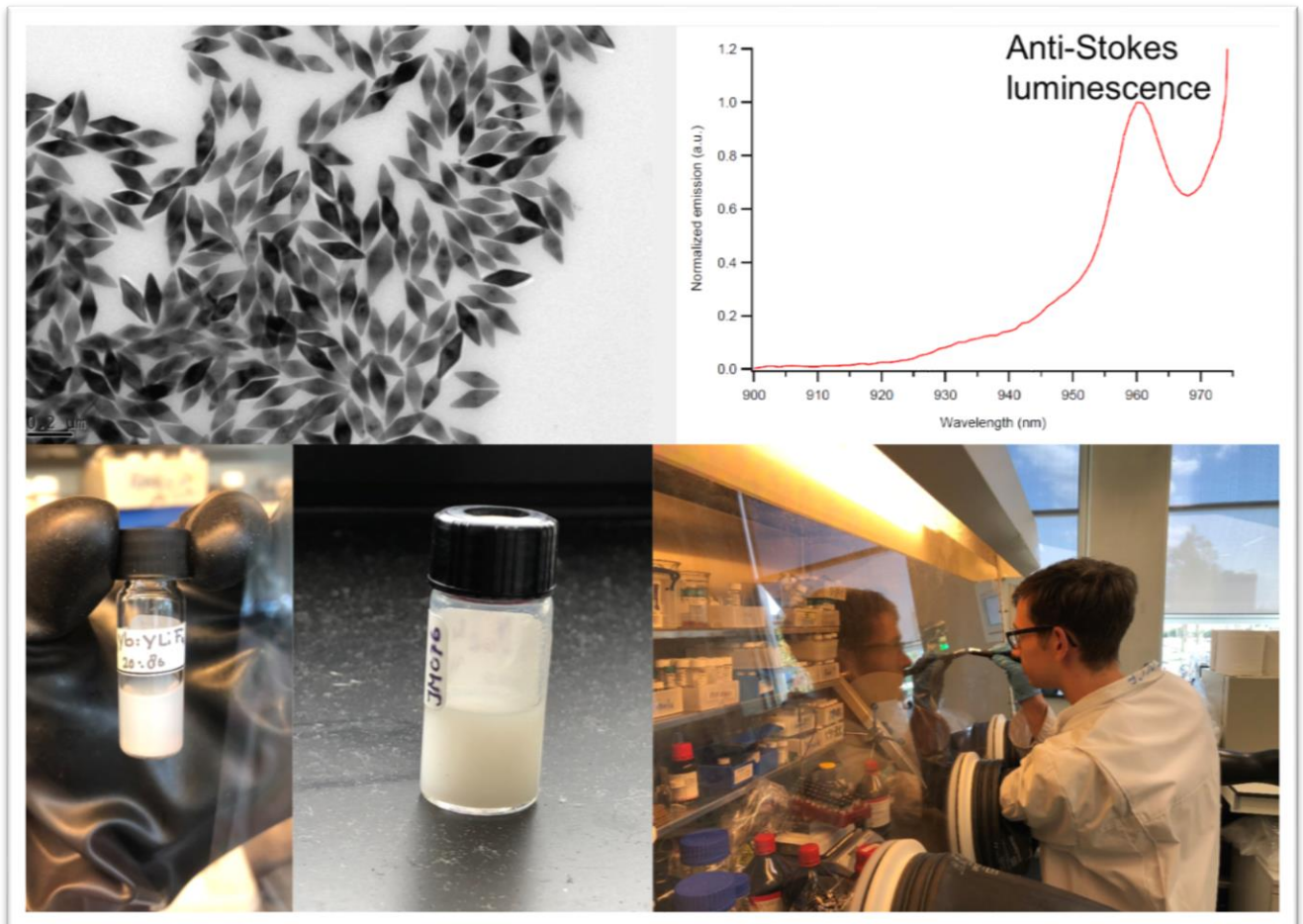
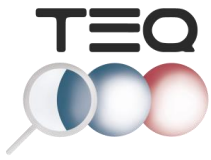


NEWSLETTER N.2, September 2018



Details and moments of the TEQ experiments at TUDelft. *Credits: Delft University of Technology*



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## UPDATES OF WORK DONE

### Updates on the TEQ Website

The TEQ Website is constantly improving and its contents and pages are shaped on the way to serve to the dissemination purposes of the TEQ project. Besides the regular update of Publications, News, Activities and Press articles, Talks and Press releases, the following sections have been added to the Website in the last few months:

- Interviews (in 'Dissemination'): this section hosts video interviews of the TEQ partners or TEQ-related.
- Quantum Café (in 'Dissemination'): this part is dedicated to the dissemination event in the frame of the TEQ project. Will host documents, pictures, video and other material related to the Quantum Café.
- Templates (in 'Documents'): this section hosts downloadable template documents useful for the administrative work of the TEQ project. At the moment, partners can find a 'Scientific meeting informational sheet' to be filled in after a TEQ-relevant scientific meeting and sent back to the TEQ Administrative Officer.

## PUBLICATIONS

(for more info, please go to [www.tequantum.eu](http://www.tequantum.eu), in 'Documents' → 'Dissemination')

Here below, the new publications:

Authors	Title	Journal	Volume	Pages	Year
Carlesso, Matteo, Luca Feriardi, and Angelo Bassi	Colored collapse models from the non-interferometric perspective	The European Physical Journal D.	72	159	2018
Carlesso, Matteo, Andrea Vinante, and Angelo Bassi	Multilayer test masses to enhance the collapse noise	Physical Review A.	98	22122	2018
Carlesso, Matteo, Mauro Paternostro, Hendrik Ulbricht, Andrea Vinante, and Angelo Bassi	Non-interferometric test of the continuous spontaneous localization model based on rotational optomechanics	New Journal of Physics	20	083022	2018

L. Mancino, M. Sbroscia, E. Rocca, I. Gianni, V. Cimini, M. Paternostro, and M. Barbieri	Information-reality complementarity in photonic weak measurements	Physics. Review A.	97	062108	2018
Magdalena Zych, Caslav Brukner	Quantum formulation of the Einstein equivalence principle	Nature Research		15	2018

#### DISSEMINATION ACTIVITIES

(for more info, please go to [www.tequantum.eu](http://www.tequantum.eu), in 'Documents' → 'Dissemination')

Type of activity	Author	Title of activity	Title of event	Place	Type and size of audience
Talk	C. Brukner	Quantum mechanics and the covariance of physical laws from quantum reference frames	Quantum Foundations and Quantum Information Workshop	Natal, Brazil	Academic (80)
Talk	C. Brukner	Quantum mechanics and the covariance of physical laws from quantum reference frames	4th Seefeld workshop on Quantum Information	Seefeld, Austria	Academic (50)
Conference	C. Brukner	Quantum Causal Structures	New Directions in the Foundations of Physics	Palazzo dei Papi, Viterbo, Italy	Academic (30)
Workshop	C. Brukner	Review of Process Matrix Formalism	Interplay of quantum information, foundations and gravity	Austrian Academy of Sciences, Vienna, Austria	Academic (20)
Conference	M. Carlesso	Dissipative and colored collapse models from the non-interferometric	Is quantum theory exact? The quest for the spin-statistics connection violation and related items	Frascati, Italy	Academic (60)

Workshop	A. Bassi	The GRW model and its developments	The quantum2classical transition	Glasgow,UK	Physicists (30)
Workshop	A. Bassi	Collapse of the wave function and the possible role of gravity	QUISCO meeting	Galsgow,UK	Physicists (15)
Workshop	A. Bassi	Wave function collapse and gravity	Is Quantum Theory Exact? The quest for the spin-statistics connection violation and related items	Frascati,Italy	Physicists (40)
Short talk	M.Marchese	Assessing collapse models in quantum optomechanics: the dissipative case	Lake Como School of Advanced Studies	Como,Italy	Physicists (30)
Conference	M. Carlesso	Non-interferometric diagnostics of collapse models	Quantum Engineering of Levitated Systems	Benasque, Spain	Academic (80)
Lecture	Catalina Curceanu	7 (+1) mysteries of Modern physics		Kardinia College, Geelong, Australia	Students (250)
Colloquium/Seminar	Catalina Curceanu	Stars and Cats: from exotic atoms studies to impossible atoms hunting to explore the Universe		Australia	Students (100)
Lecture	Catalina Curceanu	Black Holes: monsters of wizards?		Don College, Devonport Australia	Students (30)
Lectures	Catalina Curceanu	Why should I care about physics? From atoms to cancer therapy and more!		Australia	Students and general public (182)

Public lecture for children	Catalina Curceanu	Sulle tracce del Piccolo Principe: alla ricerca degli esopianeti	Researchers' Night 2018 – European project	Italy	General public (20)
School	Angelo Bassi	Meccanica Quantistica	Stage Estivo "Studiare Fisica a Trieste" 2018	Trieste	Students (30)
Conference	Angelo Bassi	Gravitational decoherence and gravitational wave function collapse	International Iranian Conference on Quantum Information	Teheran, Iran	Students and scholars (150)
School	Angelo Bassi	Decoherence	FOMO 2018	Crete, Greece	PhD students, junior researchers (50)
Workshop	Angelo Bassi	Testing spontaneous wave function collapse	The Universe as a Quantum Lab	Paris, France	Scholars (70)
Workshop	Andrea Vinante	Testing spontaneous collapse models with mechanical experiments	Ninth International Workshop DICE2018, "Spacetime - Matter - Quantum Mechanics"	Italy	Academic (100)

## NEWS

### **TEQ on the cover of New Scientist**

How does the world crystallise from quantum weirdness? We might just have the answer, says a new article on the cover of the July 14, 2018 issue of the New Scientist. And that answer could be given by the TEQ project.

The article explains how the TEQ project will cool and levitate a virus-sized glass spheres in a magnetic field, monitoring their motion with lasers and observing the results which could lead to the establishment the ultimate bounds to the validity of the quantum framework, if any.

This article on the well-known English science magazine is doubtlessly another clear acknowledgment of the important work of TEQ.

### **Bassi and Vinante on Scientific American**

The TEQ teams work to establish the large-scale limit of quantum mechanics trying to answer questions that are so far unaddressed: why we have no evidence of non-classical behavior in the macroscopic world? How is quantumness lost as we abandon the microscopic domain? To find answers, TEQ partners are undergoing tests of quantum effects for systems whose mass is orders of magnitude larger than that employed in the most successful quantum experiments to date.

The PI of the TEQ project, Dr Angelo Bassi, alongside Dr with Andrea Vinante, has been recently interviewed for the cover article of the July issue of Scientific American, the prestigious American popular science magazines, in which he talks about the efforts to understand the true nature of the matter in between the micro and the macro.

The article explains how the microscopic and macroscopic worlds do not blend seamlessly: the probabilistic nature of quantum mechanics reigns over the first, whereas the second observes more logical "classical" rules. World top researchers in the field have a say in the piece and share their findings and opinions.

### **Award to Dr Curceanu**

Dr Catalina Oana Curceanu, the PI of the LNF-INFN group of TEQ, was among the winners of the "100 Award for the Centenary" awarded by the Ministry for Romanians Abroad on the occasion of the Centenary of the Romanian Great Union, on 22nd June 2018 at the Accademia de Romania in Rome (Italy). The prize – which was awarded to ten Romanian citizens resident in Italy for their achievements in academic, scientific, social and cultural fields – rewarded Catalina's commitment in her research in nuclear and quantum physics, as well as in scientific dissemination. "I am happy and proud to receive this acknowledgement from my home country", says Catalina, "I share this award with my colleagues of the TEQ project, looking forward to testing together the large scale limit of quantum mechanics". Congratulations to Catalina!

## UPCOMING ACTIVITIES

### TEQ SC Meeting in Delft

The next TEQ Steering Committee Meeting will be held on November 8 and 9, 2018, at TUD (Delft). The members of the Steering Committee agreed to extend the meeting to other TEQ members to further discuss the progresses of the TEQ experiments and theory. With this aim, a TEQ Junior Workshop will be organized on the first day of the meeting to give space to the young researchers of TEQ and open up the discussion about the developments of the project. The second day will be dedicated to the continuation of the scientific discussion (both theory and experiments). For more information on the TEQ SC Meeting, visit <http://tequantum.eu/?q=node/214>.

### UniTs organize Quantum Café

The Quantum Café is a science popularization event developed in the frame of the TEQ research by the partner UniTs. The Quantum Café is an interdisciplinary and inclusive initiative, intended for the general public, that combines science, music and theatre to enhance public participation in the scientific arena and offer food for thought on quantum mechanics. The event is planned over 3 evenings in October and November 2018 at Il Caffè dei Libri in downtown Trieste. Every evening the program proposes readings of biographies of well-known physicists, live music and a scientific talk followed by a discussion with the audience. Queen's University Belfast gives contributions to the last evening with a talk on algorithms, telecommunications and cryptography. The event is promoted by the Department of Physics of the University of Trieste and co-funded by Assicurazioni Generali. See poster below.



# TRIESTE QUANTUM CAFÈ

Autumn 2018

Science, music, theatre: getting to know quantum mechanics

## surfing the wave of quanta Tuesday, October 9, 6:30 pm

**Erwin Schrödinger, paradoxical purr**  
By Associazione Culturale Teatrobàndus

**Waves and particles, how quantum mechanics describes matter**  
Angelo Bassi, University of Trieste & INFN

*The event is moderated by  
students of Master Course in Science Communication F. Prattico, SISSA*

*Music performed by  
students of Music Conservatory G. Tartini*

## long-distance relationships Tuesday, October 23, 6:30 pm

**GianCarlo Ghirardi, the passion for quantum mechanics**  
By Associazione Culturale Teatrobàndus

**Quanta and their strange correlations**  
Fabio Benatti, University of Trieste & INFN

*The event is moderated by  
students of Master Course in Science Communication F. Prattico, SISSA*

*Music performed by  
students of Music Conservatory G. Tartini*

## the computer of tomorrow Tuesday, November 6, 6:30 pm

**Richard Feynman, the rhythm of physics**  
By Associazione Culturale Teatrobàndus

**Algorithms, telecommunications, cryptography: the quantum revolution**  
Mauro Paternostro, Queen's University Belfast, UK

*The event is moderated by  
students of Master Course in Science Communication F. Prattico, SISSA*

*Music performed by  
students of Music Conservatory G. Tartini*

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The Trieste Quantum Cafè  
is part of the TEQ projects,  
funded by the European  
Commission.  
Initiative developed by  
Angelo Bassi



UNIVERSITÀ DEGLI STUDI DI TRIESTE  
Dipartimento di Fisica

**GENERALI**



teatro  
bàndus

TEATRO  
TEATRO  
TEATRO  
TEATRO  
TEATRO

Compagnie  
di musica  
Gruppo  
Tartini

AISF  
TRIESTE  
BARCOLANA  
IN CITTA'