

Conference Frontiers of Quantum and Mesoscopic Thermodynamics 2017

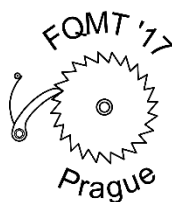
## Public Lecture of Anton Zeilinger with Concert

Mayakovsky Hall of National House of Vinohrady  
Tuesday July 11, 2017

19:00 – 19:15	Music introduction Opening address
19:15 – 20:15	Anton Zeilinger: “From Quantum Puzzles to Quantum Information Technology”
20:15 – 20:30	Discussion
20:30 – 20:45	Break
20:45 – 22:00	Concert

### Music Introduction

<b>J. Kšica</b> J. Fišer (trumpet) M. Kejmar (trumpet, flugelhorn) J. Kšica (organ) M. Misár (trumpet)	<b>Fanfares of light</b>
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# **“From Quantum Puzzles to Quantum Information Technology”**

**Anton Zeilinger**

*VCQ, Faculty of Physics, University of Vienna,  
Institute of Quantum Optics and Quantum Information IQOQI,  
Austrian Academy of Sciences*

What are Schrödinger’s cat, Einstein’s “spooky action at a distance” and his comment that God does not play dice with the Universe all about? Such puzzles led to many experiments which gave rise to world-wide activities to develop quantum information technologies.

The question raised by Schrödinger’s cat is how large quantum systems can be. It will be argued that this is a practical question for experimental development in the future with currently no limit in sight.

Einstein’s “spooky action at a distance” epitomizes the importance of quantum entanglement. The discussion began by Einstein, Podolsky, and Rosen in 1935 has led to Bell’s Theorem. Most recently, experiments have been realized closing more loopholes in such test of local realistic (“classical”) views than ever before. In the most recent “Cosmic Bell Experiment”, the source of randomness came from distant stars.

Likewise, the randomness of individual quantum events is now considered a fundamental constituent of our understanding of Nature. Its most recent application is the NIST randomness beacon.

A most interesting and rather visual work horse have become orbital angular momentum (OAM) states, “screws of light”. These can be used to carry much more information than one bit per photon, and they can be entangled in very high dimensions. These features open up new possibilities, also relevant for fundamental questions. Realizations include 3-dimensional, 3-particle GHZ states.

To date, the fundamental concepts, demonstrated by these puzzles, became the basis for the emerging quantum information technology. It includes quantum teleportation, and quantum computation.

I expect that a future quantum internet will combine these ideas. It will consist of quantum computers connected by quantum links carrying photons. I will shortly introduce these fields. From a fundamental point of view, some of the technical realizations have helped to sharpen our basic questions about the nature of quantum systems.

**Anton Zeilinger**

Anton Zeilinger has always been interested in fundamental questions of quantum physics. With his group he has performed a number of experiments realizing for the first time key predictions of quantum physics for neutrons, atoms, molecules, and photons. In recent years he focusses on quantum entanglement. There, he carried out the first experimental realization of entanglement between more than two quantum systems, today called GHZ states after their discoverers Greenberger-Horne-Zeilinger. Quite unexpectedly these results have become basic in the emerging technology of quantum information which includes quantum computation and quantum communication. His group pioneered a number of important quantum information protocols, like hyper-dense coding, quantum teleportation, entanglement swapping, and entanglement-based quantum cryptography. Currently he is an Emeritus Professor of Physics at the University of Vienna, and President of the Austrian Academy of Sciences.

# Program of the concert

**M. A. Charpentier** (1643 – 1704)

J. Fišer (trumpet)

M. Kejmar (trumpet)

J. Kšica (organ)

**T. Albinoni** (1671 – 1751)

M. Kejmar (flugelhorn)

J. Kšica (harpsichord)

**J. D. Zelenka** (1679 – 1745)

Ars Instrumentalis Pragensis

**I. Séquardt**

Ars Instrumentalis Pragensis

**J. Haydn** (1732 – 1809)

M. Kejmar (trumpet)

J. Kšica (piano)

**W. A. Mozart** (1756 – 1791)

M. Kejmar (trumpet)

J. Kšica (harpsichord)

**W. A. Mozart** (1756 – 1791)

Ars Instrumentalis Pragensis

**J. Brahms** (1833 – 1897)

I. Fleischhansová-Butler (violin)

T. Víšek (piano)

**A. Dvořák** (1841 – 1904)

M. Kejmar (trumpet)

J. Kšica (piano)

**F. Drdla** (1868 – 1944)

I. Fleischhansová-Butler (violin)

T. Víšek (piano)

**F. Chopin** (1810 – 1849)

T. Víšek (piano)

**Prelude**

from Te Deum

**Adagio**

from Sonata No. 6 in A minor

**Trio Sonata No. 3 in B flat major**

Adagio (Andante), Allegro, Largo,  
Allegro-tempo giusto

**Tema con variazioni di Adam  
Michna**

**Andante**

from Concerto in E flat major

**Ora Pro Nobis**

**Quintet No. 3 in C major**

II. Andante, III. Rondo  
arranged by I. Séquardt

**Sonata No. 3 in D minor**

I. Allegro, IV. Presto agitato

**My Mother Taught Me**

from Gypsy Songs

**Serenade**

**Nocturne in G major**

Op. 37, No. 2

**D. Milhaud** (1892 – 1974)  
J. Nečasová Nardelli (piano)  
T. Víšek (piano)

**G. Gershwin** (1898 – 1937)  
M. Kejmar (trumpet)  
J. Kšica (piano)

**Italian Anonymous** (17<sup>th</sup> century)  
J. Hlaváč (alt saxophone)

**J. Hlaváč**  
J. Hlaváč (alt saxophone)  
M. Kejmar (trumpet)  
J. Kšica (piano)

**Scaramouche**  
for four hand piano  
Part 1 Vif, Part 3 Brasileira  
arranged by O. Hubáček

**Embraceable you**

**Melody**

**Homage to Vienna**

## Performers

### **Iva Fleischhansová-Butler (violin)**

Iva Fleischhansová studied in Prague at the Academy of Performing Arts with Nora Grumliková. In 1994, Iva moved to the UK for her postgraduate studies at the Royal Northern College of Music in Manchester with Lydia Mordkovich. Fired with enthusiasm for period performance, she also studied with Pauline Nobes and Andrew Manze. While in Prague, Iva was a co-leader of the Suk Chamber Orchestra and a member of the Talich Chamber Orchestra. Since her settling in the UK she has worked with Manchester Camerata, the Royal Liverpool Philharmonic Orchestra, the London Festival Orchestra, the Orchestra of the Age of Enlightenment, the London Classical Players, the Academy of Ancient Music, the Sixteen and others and toured with them extensively in Europe, America and Japan. She regularly performs with the renowned Czech pianist Tomáš Víšek, in a violin duo with her husband Mark Butler, the Lux Ensemble, and the Bosch Quartet. She has also made recordings for BBC films and for Czech Radio. Iva is sought after as a leader in community orchestras. She currently leads the Orchestra da Chiesa with which she performed Mahler's Eighth Symphony in 2015. Iva also enjoys teaching violin and musical skills to very young children as a Colourstrings teacher.

### **Jiří Hlaváč (alto saxophone)**

Jiří Hlaváč graduated from the Academy of Performing Arts in Prague (Professor Říha). He is known primarily as a fine instrumentalist who has excelled as a soloist of various classical and contemporary works, showing not only his brilliant technical virtuosity but also his unique sense of the instruments range of color. He has played as a soloist with many ensembles over the world. He is a holder of the Golden Shield Award, Grammy Classic, Title "Man of the Year", and award from the ABI (American Biographical Institute). Jiří Hlaváč also pays his attention to organizational work. He is a founder and an art director of specially orientated chamber ensemble which, under the name Barock Jazz Quintet, has over the years performed both standard jazz works and compositions by 20th century composers as Aaron Copland, Igor Stravinsky, Darius Milhaud and Leonard Bernstein. His broad range of activities is complemented by his endeavors to popularize music and to organize musical events. He is chairman of The Committee of the International Radio Competition for Young Musicians Concertino Praga and chairman of The Prague Spring International Music Competition. He also devotes his time to pedagogical work: Jiří Hlaváč is a Professor at the Music faculty of The Academy of Performing Arts in Prague where, he was dean from 2000 till 2006. Apart from teaching in Prague, he also often participates as a teacher at international courses and master classes throughout the world.

### **Miroslav Kejmar (trumpet, flugelhorn)**

Miroslav Kejmar graduated from The Prague Conservatory after studies with Professor Junek. He then studied in the class of Professor Václav Pařík at The Prague Academy

of Arts. Already during his studies at The Academy of Arts in Prague, he played in various orchestras, e.g. in the Film Symphony Orchestra and the Czech Philharmonic Orchestra. Apart from guest appearing with several chamber brass ensembles, he works on a permanent basis with the Prague Brass Soloists, of which is a founding member. His career as a soloist is equally wide-ranging. He is well known to audiences in many European countries, as well as Japan. Apart from classical music, he is also interested in dance, jazz and popular music. For about three years he played in the orchestra involved in the famous musical, Jesus Christ Superstar. He was a member of the Karel Vlach orchestra. Miroslav Kejmar was, over thirty years, the first trumpeter of the Czech Philharmonic Orchestra, and played many years with the "Ten of the Best" ensemble, the famous international group of trumpeters. He nowadays plays frequently as a soloist; he is a member of the Prague Brass Soloists and Czech Philharmonic Brass ensembles.

### **Josef Kšica (harpsichord, piano)**

Josef Kšica studied organ at the Conservatory in Brno and at the Academy of Performing Arts in Prague in the class of professors Milan Šlechta and Jiřina Pokorná. In addition, he studied composition with Professor Jan Duchoň. After many years of practicing as an organist and a singer of Czech leading choirs (Prague Philharmonic Choir, Prague Chamber Choir) Mr. Kšica became the choirmaster in St. Vitus Cathedral in Prague. Beside these activities, he performs old Czech as well as world sacred music, occasionally in new premieres. He also cooperated with the specialist on Bach music, Professor H. Rilling. As an organist, Mr. Kšica has been performing at concerts in his country and abroad. He has also been increasingly seen on the stage as a conductor. Aside from his interpretation achievements, Josef Kšica is a well-known scholar and editor for many European archives. *Ars Instrumentalis Pragensis*, in particular, is grateful to him for his continued broadening of their repertoire.

### **Jindra Nečasová Nardelli (piano)**

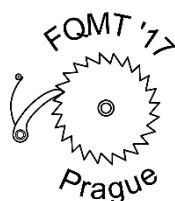
Jindra Nečasová Nardelli studied at the Conservatory of Music in Prague from which she graduated in piano under Dr. Jaromír Kříž and in composition under Dr. Jindřich Feld. The symphonic picture Jackson's Journey, based on the novel by Gérard Herzog, became her graduating work for which she was awarded Best Composition of the Year from the Prague Conservatory. Her studies in composition were completed at the Academy of the Performing Arts in Prague under Professor Václav Riedlbauch. Jindra Nečasová Nardelli also participated in several composition contests, which earned her, among others, the Czech Music Fund Award for her Little Symphony in a competition announced by the Czech Ministry of Culture. The composition entitled the Spirit of Lake Michigan for wind symphonic orchestra was composed for the occasion of the "All Czech Composers Concert" at the Boutell Memorial Concert Hall for the Northern Illinois University. Jindra Nečasová Nardelli is the author of numerous chamber, symphonic, vocal and solo compositions, as well as ballets, a great deal was published in the USA (Alliance Publications Inc.). She has also written the music to multimedia artistic film *Sirael* for Czech Television. Mrs. Nečasová Nardelli as a pianist presents her own compositions at concerts, has also met her piano recital in Ferrara, Italy. She accompanies the singer's concerts (american singer Anita Smisek, Leo Marian Vodička and his pupils) and she is playing in piano duo with Tomáš Víšek.

## Tomáš Víšek (piano)

Tomáš Víšek developed his carrier as a solo pianist after graduating from the Prague Conservatory (Professors V. Kameníková and Z. Kožina), and from the Academy of Music Arts in the class of Professors J. Páleníček and Z. Jílek. He has established his reputation performing both famous and lesser known repertoire, some of which being undeservedly neglected. He has toured throughout the world including Austria, Holland, Switzerland, France, Italy, Egypt, Japan, USA, and has made recordings for radio and television and on CDs. Tomáš Víšek won numerous prizes in international competitions (Hradec Králové, Vienna, Ragusa, Paris), in 2013 he won the 1st prize and CMF Prix at the "Concours Musical de France" in Paris, in 2015 the 1st prize at the competitions „Music Without Limits“ (Druskininkai) and „Grand Prize Virtuoso“ (video-competition), in 2016 he won the 1st prize at the „International Master Competition for Music Teachers“ in Warsaw. His solo recital in the Prague Spring Festival in 1997 and the further performances there in 2002, 2003, 2006, and 2014 were met with high acclaim, as were his interpretation of Gershwin's Rhapsody in Blue in the sold out Rudolfinum concert hall in Prague.

## Ars Instrumentalis Pragensis

The ensemble has gained great international recognition ever since it came into existence in 1987. It consists of five instrumental players: Luboš Hucek (bassoon), Josef Kšica (organ, harpsichord, piano), Pavel Nejtek (double-bass), Liběna Séquardtová (oboe), Ivan Séquardt (oboe, horn) each of whom is the top representative in his/her field. All of them have played with many internationally known ensembles and they have been awarded prizes from competitions at home and abroad. The ensemble has been concentrating, apart from German, Italian, French and English baroque compositions, on Czech baroque instrumental music dominated by the works of the "Czech Bach" Jan Dismas Zelenka, whose great instrumental cycle of six trio sonatas was recorded by the ensemble in 1994. Ars Instrumentalis Pragensis was highly praised for its interpretation of these Zelenka's sonatas. The ensemble won the First prize and a gold medal at the international competition in Osaka, Japan.



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