

Conference Frontiers of Quantum and Mesoscopic Thermodynamics 2013

## Public Lecture of Serge Haroche with the Concert

Dvořák's Hall of Rudolfinum  
Tuesday July 30, 2013

18:30 – 18:45	Music introduction Opening address by Roger Balian
18:45 – 19:45	Serge Haroche: “Juggling with photons in a box to explore the quantum world”
19:45 – 20:00	Discussion
20:00 – 20:20	Break
20:20 – 21:20	Concert - first part
21:20 – 21:30	Intermission
21:30 – 22:30	Concert - second part

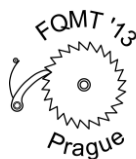
### Music introduction

**Ch. M. Widor (1844-1937)**  
P. Kšica (organ)

**Toccata from Organ Symphony No 5**

**J. Clarke (1674-1707)**  
M. Kejmar (trumpet)  
P. Kšica (organ)

**Prince of Denmark's March**



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# **“Juggling with photons in a box to explore the quantum world”**

## **Serge Haroche**

*Collège de France and Ecole Normale Supérieure, Paris*

Atoms interacting with microwave photons trapped between highly reflecting mirrors realize an ideal system to perform some of the thought experiments imagined by the founding fathers of quantum physics and to illustrate fundamental aspects of the quantum measurement theory. While photons are generally annihilated when detected, we are able to count light quanta without destroying them. This has allowed us to manipulate and control light fields in novel ways. We have for instance prepared and detected so called "Schrödinger cats" of radiation, in reference to the famous feline that the Austrian physicist imagined to be suspended between life and death. In our experiments, we generate a field made of a few photons which is suspended between two states with opposite phases and we observe how this counterintuitive superposition vanishes under the effect of decoherence. The study of this kind of strange states, impossible to comprehend by classical logic, is now developing in many laboratories around the world in a very active and fast expanding domain of research called quantum information science. By controlling and manipulating simple atomic or photonic systems in state superpositions, scientists hope to develop new devices which will use the principles of quantum physics to improve the precision of measurements, the secrecy of communications or the power of computer simulations.

## **Serge Haroche**

Serge Haroche (born September 11, 1944) is a French physicist and Nobel Laureate. He shared the 2012 Nobel Prize in Physics with David J. Wineland for "ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems". Serge Haroche was born in Casablanca. He left Morocco and settled in France in 1956. He worked in the Centre National de la Recherche Scientifique (CNRS) as a research scientist. Later on he took a professor position at Paris VI University. At the same time, he taught in other institutions, e.g. at Harvard University, and Yale University. He was head of the Physics Department at École Normale Supérieure from 1994 to 2000. Since 2001, Serge Haroche has been a Professor at the Collège de France, working at the Laboratoire Kastler-Brossel of the École Normale Supérieure (Paris) in atomic physics and quantum optics.

Serge Haroche is well known for proving quantum decoherence by experimental observation. After his Ph.D. studies on dressed atoms under the supervision of Claude Cohen-Tannoudji (Nobel Laureate in physics, 1997), he developed new methods for laser spectroscopy. He then moved on to Rydberg atoms, giant atomic states particularly sensitive to microwaves, which make them well adapted for studying the interactions between light and matter. He showed that such atoms, coupled to a superconducting cavity containing a few photons, are well-suited to the testing of quantum decoherence and to the realization of the quantum logic operations necessary for the treatment of quantum information.

# Program of the concert

**J. S. Bach** (1685-1750)

J. Kšica (organ)

**Toccatà and Fugue in D minor**

**G. F. Handel** (1685-1759)

M. Kejmar (trumpet)

Y. Tanaka (trumpet)

J. Kšica (organ)

**Concert for two trumpets in A flat major**

Andante, Allegro, Larghetto

**G. F. Handel** (1685-1759)

M. Kejmar (trumpet)

Y. Tanaka (trumpet)

J. Kšica (organ)

**Voluntary V in D major  
for two trumpets**

**J. S. Bach** (1685-1750)

Y. Waldman (violin)

**Sarabande from Partita No 2  
in D minor for violin solo**

**Y. Waldman** (1946)

Y. Waldman (violin)

**Jerusalem of Gold, Fantasy for  
violin**

**V. Trojan** (1907-1983)

Y. Waldman (violin)

K. Švábová (guitar)

J. Lukeš (accordion)

**The Emperor's Nightingale:**

1. Telling the fairy-tale

2. Through the Chinese countryside

3. Nightingale's concert

7. The emperor's march

10. The emperor's recovery of body  
and soul

**A. Tansman** (1897-1986)

T. Víšek (piano)

**Sonatine Transatlantique**

I. Fox-Trot

**T. Albinoni** (1671-1751)

M. Kejmar (trumpet),

P. Kšica (organ)

**Adagio in G minor**

**A. Dvořák** (1841-1904)

Y. Waldman (violin)

T. Víšek (piano)

**Sonatina, op. 100**

I. Larghetto, IV. Finale - Allegro

**Intermission**

**10 min.**

**M. Reger** (1873-1916)  
P. Kšica (organ)

**Fantasy and Fugue on BACH**

**J. Ježek** (1906-1942)  
T. Víšek (piano)

**Isabel Valse**

**G. Gershwin** (1898-1937)  
Y. Waldman (violin)  
Víšek (piano)

**It Ain't Necessarily So  
from Porgy and Bess arranged by.  
J. Heifetz**

**G. Gershwin** (1898-1937)  
M. Kejmar (trumpet)  
Y. Waldman (violin)  
J. Kšica (organ)

**Summertime from Porgy and Bess**

**H. Arlen** (1905-1986)  
M. Kejmar (trumpet)  
P. Kšica (organ)

**Somewhere Over the Rainbow**

**C. François, J. Revaux, P. Anka**  
M. Kejmar (trumpet, flugelhorn)  
P. Kšica (organ)

**My Way**

**J. Kšica**

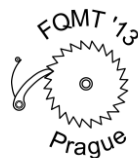
**Organ improvisation**

## Performers

### **Yuval Waldman (violin)**

Violinist and conductor, Yuval Waldman has been described as “brilliant” (Musical America) and “spectacular” (The New York Times). Born in Russia, Waldman played his first public performance at the age of 8. He studied violin with Isaac Stern, Ivan Galamian, Joseph Gingold, Rene Benedetti, Lorand Fenyves and took part in Master classes with Joseph Szigeti, Nathan Millstein, Henryk Szeryng, Zino Francescatti. Raphael Kubelik, Jorge Mester, Leonard Bernstein, William Vaccano were his teachers of conducting.

Yuval Waldman made his New York debut on the International Series at Carnegie Hall, Jeunesse Musicales. He is a versatile performer who has earned acclaim both for his playing of the standard repertory and for his thoughtful and stylish interpretations of Baroque music. He has also championed rarely performed nineteenth century masterpieces and commissioned or premiered works by contemporary American and Israeli composers. Yuval Waldman has appeared as a violin soloist with dozens of prominent orchestras in the United States, Canada, Europe and Israel and given recitals at Carnegie Hall, Lincoln Center, The Kennedy Center, Wigmore Hall in London and Concertgebouw in Amsterdam. He has performed with such artists as Isaac Stern, Pinchas Zuckerman, Jean-Pierre Rampal, Maureen Forrester and Henrik Szeryng. He is the first violinist in the acclaimed Kinor String Quartet and a winner of the America-Israel Cultural Foundation Prize and the Distinguished First Prize at the Conservatory of Geneva. He has recorded on the Angel, Newport Classics, Omega Classical, CRI, Musique International and Musical Heritage Society labels. His career as a conductor includes performances and recordings with several of the orchestras listed above, as well as the New American Chamber Orchestra, the Mid-Atlantic Chamber Orchestra; the Philadelphia Chamber Orchestra and the Cologne Opera. He celebrated the fiftieth anniversary of the founding of Israel in Moscow and conducted the memorial concert on the steps of Congress on September 11, 2002. He was the founding music director of the Madeira Bach Festival, the Jefferson Music Festival in Washington D.C., the Opus Berkshire Festival in Massachusetts and the Benedictine Millennium Festival in Rome. He has served as director of the World Bank Mozart Festival and the Mid-Atlantic Chamber Orchestra. In 2005, Maestro Waldman founded Music Bridges International, Inc., ([www.musicbridgesinternational.com](http://www.musicbridgesinternational.com)), to foster cross-cultural music exchange programs that feature the music of different countries.



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### **Miroslav Kejmar (trumpet)**

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 interested in the domain of dance, jazz and pop music. For about three years he played in the orchestra involved in the production of famous 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 Prague Brass Ensemble.

### **Josef Kšica (organ)**

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.

### **Přemysl Kšica (organ)**

Přemysl Kšica graduated from the Prague Conservatory (organ, the class of Professor Popelka). He continued his studies of organ at the Academy of Music Arts in Prague and Staatliche Hochschule für Musik und Darstellende Kunst in Stuttgart with Professor Ludger Lohmann. He studied also organ improvisation with Professors Jaroslav Vodrážka, Jaroslav Tůma a Johannes Mayr. Přemysl Kšica won numerous prizes in Czech and international organ competitions. He plays regularly in Prague churches, especially in the Church of Our Lady of the Snow. He has been performing at many concerts in his country and abroad.

### **Jiří Lukeš (accordion)**

Jiri Lukeš was born 1985 in Prague. He began study music when he was about ten years old (playing accordion). Since 2006, he studied composition with Edward Douša, in 2009 he was admitted to the Academy of Music Arts of Prague in composition class of prof. Ivana Loudová. His main activities are interpretation of contemporary solo and chamber music. He received several awards in accordion competitions in the Czech Republic, Croatia and Slovakia. He participated in master classes led by Giorgio Dellarole, Rajmund Kákoni and Teodor Anzellotti. In the composition he has recently focused on the intermediate projects with electronics. He founded, together with his colleagues, the group O.E.M. specializing in performance and audio-visual projects. He teaches at the Prague Conservatory and Children music school.

### **Kristina Švábová (guitar)**

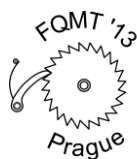
Kristina Švábová was born in Sydney Australia. In year 1994 her father Milan Šváb began to teach Kristina the classical guitar. She moved to the Czech Republic in 2001. Kristina studied at the Prague conservatory under the tutelage of Prof. Kučera. She is currently studying at the Academy of Music Arts of Prague in the class of Professor Milan Zelenka. Through her studies Kristina studied four courses at Germany and Switzerland in the class of Professor Miolin. Kristina participated at guitar solo competitions: Český Rozhlas - 2nd prize, The competition of Conservatoires - 3rd prize. In chamber music with Jiří Lukeš they participated in international competitions: Pula - 1st prize, Slovakia - 2nd prize.

### **Yasuko Tanaka (trumpet)**

Yasuko Tanaka was born in Akita in Japan and began to play the trumpet in her elementary school's wind orchestra. She graduated from the Prague Conservatory in the class of Prof. M. Kejmar. She has successfully participated in a number of competitions: overall winner at the 30th Czech Republic Conservatory wind instrument student's Competition in Ostrava, 2nd prize at the international competition "Villa de Benidorm" in Spain and 1st prize at the International Brass Competiton in Brno. She has performed in masterclasses for distinguished trumpeters, including M. Andre, G. Touvron, J. Burgstaller and F. Flores. Yasuko is currently a student of the Prague Academy of Music Arts in the class of Professors V. Rejlek and J. Rouček.

## Tomáš Víšek (piano)

He developed a career 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 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, Japan, and has made several recordings for radio and television and on CDs. Tomáš Víšek won numerous prizes in international competitions. In 2013 he won the 1st prize and CMF Prix at the “Concours Musical de France” in Paris. His solo recital in the Prague Spring Festival in 1997 and the further performances there in 2002, 2003, and 2006 were met with high acclaim, as were his interpretation of Gershwin’s Rhapsody in Blue in the sold out Rudolfinum concert hall in Prague.



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