Prof. Jan Řídký, the director of the Institute of Physics, the Czech Academy of Sciences cordially invites you to

The 8th Dvořák Lecture

By Professor **Marco Cavaglià**

Assistant Spokesperson of the LIGO Collaboration

Depart-ment of Physics and Astronomy, University of Mississippi, USA

Gravitational-wave astrophysics

June 15th, 2016 at 4:00 pm

The Czech Academy of Sciences, Národní 3, CZ-110 00 Praha 1, Czech Republic

The lecture and the discussion will be in English only, the translation to Czech will not be provided.
The admission to the lecture is free, however it is necessary to reserve a seat using the registration form at: **fzu-rezervace.avcr.cz**

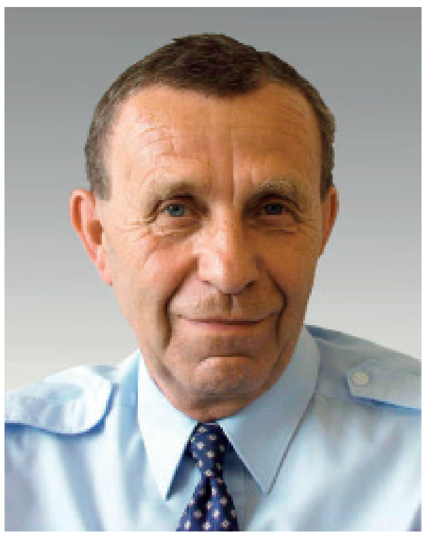
Annotation

In 1916 Albert Einstein demonstrated that the theory of General Relativity allows for wave-like, space time perturbations propagating with the speed of light. Two years later, he calculated his famous quadrupole formula, describing how these "gravitational" waves can be generated. However, due to the extreme weakness of gravity, detecting gravitational waves seemed an impossible task. They even became a matter of controversy with Einstein himself becoming convinced they did not exist. It took several decades before the first attempts to detect gravitational waves started in the sixties with the pioneering work of Joseph Weber. Although the orbital decay of the PSR B1913+16 binary pulsar provided an indirect proof of the existence of gravitational waves, their direct detection remained nevertheless elusive. The long quest to detect gravitational waves finally ended on February 11, 2016, when scientists from the Laser Interferometer Gravitational-wave Observatory (LIGO) Scientific Collaboration and the Virgo Collaboration announced the first detection of a gravitational-wave signal from a merger of two stellar mass black holes. LIGO's observation marks the beginning of gravitational-wave astrophysics, a new way to explore the sky which will deepen our understanding of the cosmos and lead to unexpected discoveries. LIGO's detection yields the first test ever of Einstein's theory of General Relativity under dynamical, extreme-gravity conditions. It provides important information about the astrophysics of stellar mass black holes, their physical structure and origin. It can be used to test General Relativity as well as fundamental physics. The LIGO result was obtained with only 16 days of coincident data. More data from the first Advanced LIGO observing run remain to be analyzed. Further improvement in LIGO's sensitivity planned for the next observing runs will produce hundreds of detections in the next years, allowing scientists to map the dark, gravitational universe. How many black holes populate the sky? How do they form and merge? What are gamma-ray bursts? What is the equation of state of neutron stars? Is General Relativity the correct theory of gravity in strong regimes? These are just a few of the unanswered questions that gravitational-wave astrophysics will help to answer.

Marco Cavaglià

Marco Cavaglià studied Physics at the University of Torino in Italy, and obtained his MSc. degree with Summa cum laude in 1992. He then continued with the Ph.D. Course in Astrophysics at the International School for Advanced Studies (SISSA) in Trieste, Italy and defended there the Ph.D. Thesis in October 1996. He then worked at several postdoctoral positions, e.g. at the Max-Planck-Institut für Gravitationsphysik in Golm in Germany (1997–1999), at University of Beira Interior in Covilhã in Portugal (1999–2000), and as the Bruno Rossi Postdoctoral Fellow at the Center for Theoretical Physics at MIT, USA (2000–2002). In 2003 he joined the Department of Physics and Astronomy of the University of Mississippi, since 2004 he worked there as an assistant professor and since 2010 as an associate professor. He is a member of the LIGO Scientific Collaboration and served as a member or chair of various working groups and committees since2008. In January 2012 he was appointed the assistant spokesperson of the LIGO Scientific Collaboration and the member of its Executive Committee.

The research activities of Marco Cavaglià have been devoted to the study of experimental and theoretical gravitational-wave detection, classical and quantum models of gravity, high energy cosmic rays, cosmology and applied mathematics. During his career he authored and co-authored almost 200 papers that were cited more than 5000 times.



Vladimír Dvořák

(1934–2007)

Solid state physicist, the most prominent Czech scientist in the theory of ferroelectricity and structural phase transitions, for the whole productive life affiliated with the Institute of Physics, Acad. Sci. Czech Rep. in Prague, its director in 1993–2001, member of the Learned Society since 1995. The main protagonist of the revolutionary reforms in the Institute of Physics after 1989.

His personality has strongly influenced the scientific program and development in the Department of Dielectrics of the Institute since the late sixties up to present. Brilliant lecturer and most respected director of the Institute.

To commemorate his work and personality, the Institute of Physics of the Academy of Sciences of the Czech Republic decided to organize an annual festive Dvořák lecture, given by prominent internationally renowned scientists in the field related to the research pursued at the Institute of Physics.

Fyzikální ústav
Akademie věd ČR, v. v. i.