

IRAFS (The International Research Area on the Foundations of Sciences) was founded in 1996 at the Lateran University by Ennio De Giorgi (Scuola Normale Superiore of Pisa), Edward Nelson (University of Princeton) and Gianfranco Basti. It is devoted to promoting interdisciplinary studies and events between pure and applied mathematical sciences and philosophy, from the standpoint of the foundational issues in both (www.irafs.org).

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Gianfranco Basti (Lateran University)
Francesco Guerra (La Sapienza University)
Flavia Marcacci (Lateran University)
Sarah Jones Nelson (Princeton University)
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Giuseppe Vitiello (Salerno University)

Organizing Committee

Gianfranco Basti
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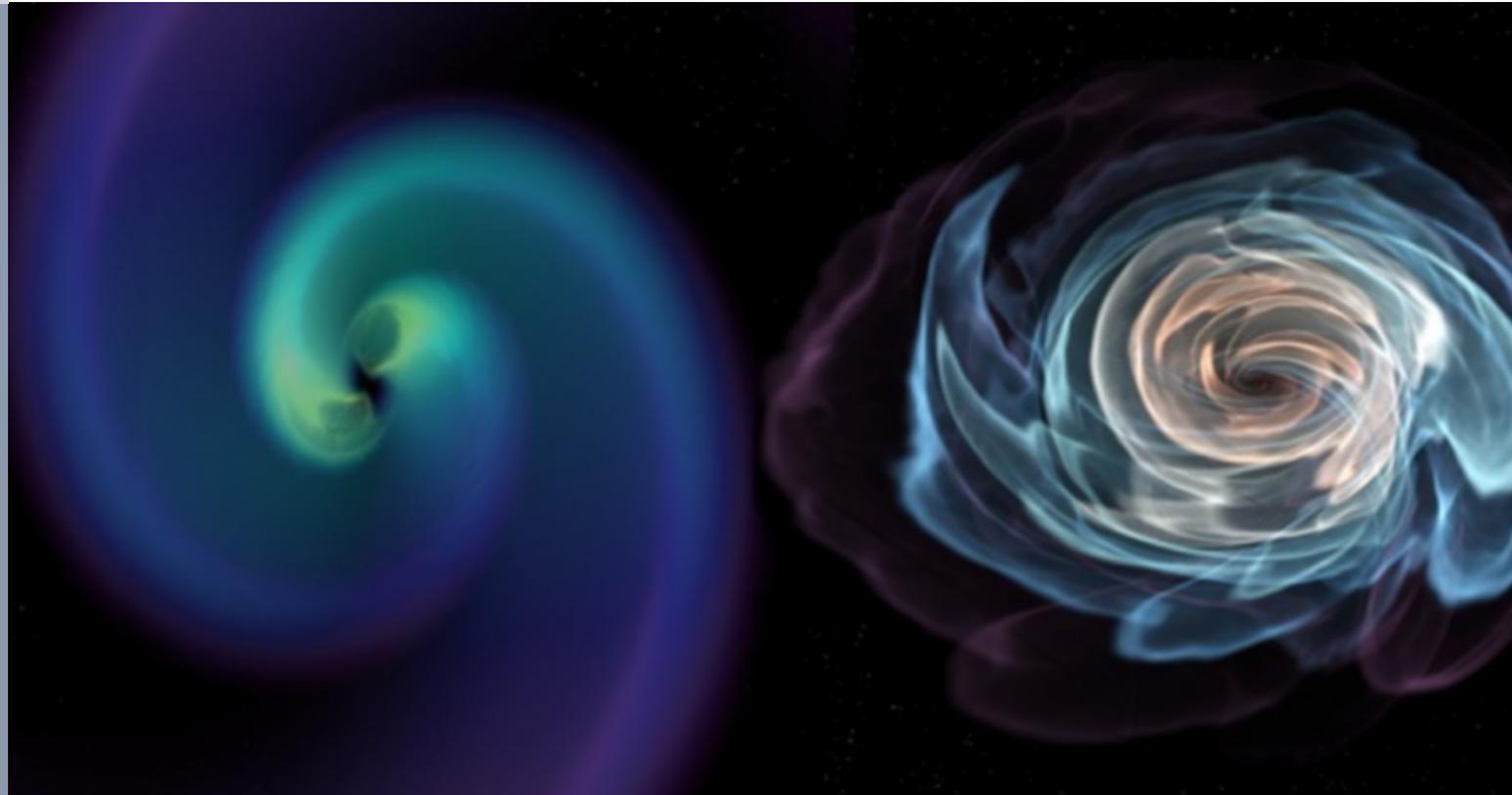
[The figure on the right is a graphic rendering of the first cosmic event (neutron star collision happened 130 million years ago) observed in both gravitational waves (left) and light (right), by the LIGO and Virgo Collaborations on October 2017].

The **STOQ** (Science, Theology and the Ontological Quest) **Project**, started in 2002 after the event of the First Jubilee of Scientists in 2000. It is a collaboration among the Pontifical Universities and other Universities and Scientific Institutions all over the world, for promoting teaching and research initiatives at the cross-border of science, theology and philosophy. For the STOQ Project at PUL: www.stoqatpul.org.

The most beautiful experience we can have is the mysterious. It is the fundamental emotion that stands at the cradle of true art and true science.
Albert Einstein

International Conference The Origins and Evolution of Space-Time

Pontifical Lateran University
November 27-28, 2018



Conference Venue:
Pontifical Lateran University,
Piazza S. Giovanni in Laterano 4 – 00120 Vatican City www.pul.it

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Aims of the Conference

In the motivations for the 2017 Nobel Prize in Physics awarded to Rainer Weiss, Barry C. Barish, and Kip S. Thorne, “for decisive contributions to the LIGO detector and the observation of gravitational waves” the Royal Swedish Academy of Sciences stated: “On September 2015, the universe’s gravitational waves, which were predicted by Albert Einstein a hundred years ago, came from a collision between black holes. It took 1.3 billion years for the waves to arrive at the LIGO detector in the USA”. After this first observation others followed during the last years that are changing deeply our scientific cosmology, inaugurating a new age in the so-called “cosmology of precision”. That is, a cosmology become a “Galileian science”, because not only based on mathematical models, but also on precise measurements confirming or refuting the mathematical hypotheses. As the press release of Caltech announcing the Nobel Prize to its three professors stated, “the observation of gravitational waves, ripples in the fabric of space and time (...), provided astronomers with an entirely new set of tools with which to probe the cosmos. Previously, all astronomy observations have relied on light – which includes X-rays, radio waves, and other types of electromagnetic radiation emanating from objects in space – or on very-high-energy particles called neutrinos and cosmic rays. Now, astronomers can learn about cosmic objects through the quivers they make in space and time”. Aim of this Conference is debating between theoretical physicists and philosophers of nature about the different aspects of the work in progress for the construction of a reliable theory of “quantum gravity”. The amazing ontological and epistemological consequences of these discoveries could be indeed that the origins and the evolution of the space-time structure of our universe have ultimately a dynamic (causal) explanation...

CONFERENCE PROGRAM Tuesday, November 27

09:00-09:15	Welcome Address: Antonio Pitta , Lateran University Vice-President
09:15-09:30	Conference Introduction: Gianfranco Basti , Lateran University, IRAFS Director
I Session	<i>Spacetime and Quantum Physics.</i> Chair: Gianfranco Basti , Lateran University
09:30-10:30	Gerard 'tHooft , University of Utrecht, Netherlands. <i>Quantized black holes as a theoretical laboratory.</i>
10:30-11:00	Coffee Break.
11:00-12:00	Giuseppe Vitiello , University of Salerno, Italy. <i>Dissipation, non-commutative geometry, and quantization</i>
12:00-13:00	Klaas Landsman , Radboud University, Netherlands. <i>Singularities and determinism.</i>
13:00	Lunch
II Session	<i>Spacetime and cosmology.</i> Chair: Mauro Dorato , University of “Roma Tre”, Italy
14:30-15:30	Don Howard , Notre Dame University, USA. <i>Why do we need spacetime?</i>
15:30-16:30	Chris Smeenk , Ontario University, Canada. <i>Spacetime geometry of the universe.</i>
16:30-16:45	Coffee Break
16:45-17:45	Sarah Jones-Nelson , Princeton University, USA. <i>Causality</i>
17:45-18:45	Francesca Vidotto , University of Basque Country, Spain. <i>Bouncing cosmology from loop quantum gravity.</i>
18:45	Session Ends.



CONFERENCE PROGRAM Wednesday, November 28

III Session	<i>Spacetime and mathematics.</i> Chair: Christopher Tully (Princeton University, USA)
09:00-10:00	Carlo Rovelli , Centre de physique théorique de Luminy, Switzerland. <i>Quantum spacetime. The lesson from loop quantum gravity.</i>
10:00-11:00	Roberto Longo , Tor Vergata University, Rome, Italy. <i>Noncommutativity, time and entropy bounds.</i>
11:00-11:30	Coffee Break.
11:30-12:30	Francesco Guerra , La Sapienza University, Rome, Italy. <i>Quantum mechanics and gravitation: a difficult merging.</i>
12:30	Lunch.
IV Session	<i>Quantum physics and the realism issue</i> Chair: Flavia Marcacci , Lateran University
14:30-15:30	Antonio Vassallo , Universitat de Barcelona, Spain. <i>A primitive ontology for quantum spacetime.</i>
15:30-16:30	Dominique Lambert , Université de Namur, Belgium. <i>Is there some place for contradictions? From paraconsistent logic to quantum physics.</i>
16:30-16:45	Coffee Break
16:45-17:45	Gianfranco Basti , Lateran University. <i>“Is physics legislated by cosmogony?” (J. A. Wheeler)</i>
17:45-18:30	Panel discussion with the speakers
18:45	Conference Ends.

