

Welcome to the conference on the Physics of the Two Infinities !



*27-30 March, 2023
Kyoto, Japan*

*International Conference on
the Physics of the Two Infinities*

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Noaki Yasuda (Tokyo)

I L A N C E
International Laboratory for Astrophysics,
Neutrino and Cosmology Experiments

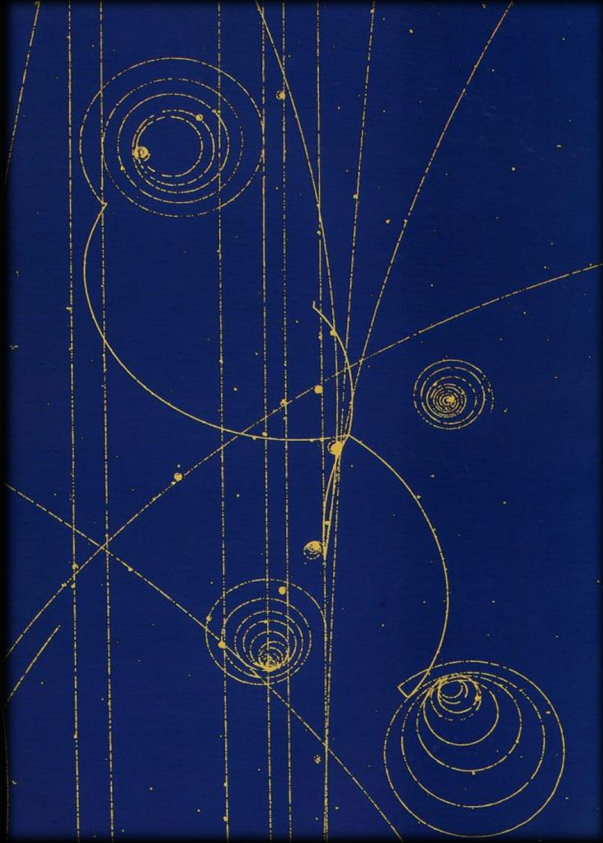
**Exploration of Particle Physics
and Cosmology with Neutrinos**

**UTokyo Strategic Partnerships Project
Paris Grandes Écoles Team**

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**KIOTO UNIVERSITY
FOUNDED 1869**

The Physics of the Two Infinities



Blaise Pascal
1623 - 1662



He was the first to write and reflect on the two infinities and the special place of human beings in the observation of the universe that surrounds them.

We are placed "halfway" between the infinitely large and the infinitely small in our universe and he wondered why ?

The Physics of the Two Infinities

Since when was this new approach introduced
about our view of the Universe ?

Before 1920s The Universe was static, without any “history” (Einstein)

1927-1929 Discovery of the expansion of the Universe (Hubble & Lemaitre)

1930s Birth of the Big Bang theory

1950s The abundance of the elements in the Universe

1960s Discovery of cosmic microwave background CMB radiation

1950s -1980s Huge progress in nuclear and particle physics. The Standard Model.

Until the 80s, the infinitely small and the infinitely large did not yet have very strong links, or were not presented in this way in textbook and among students

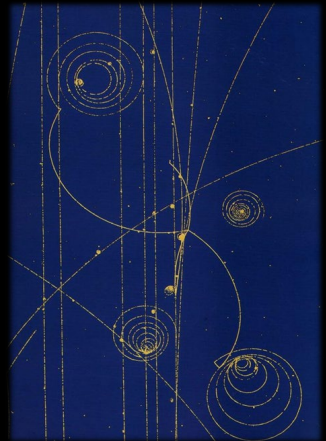
From the 1990s onward

New ideas, new data and new research programs led to the idea of the existence of very strong and direct relations between the physics of elementary particles, low and high energy astrophysics, the primordial Universe and our dark Universe

- Dark Matter (Wimps, Machos, ...)
- Higgs boson and Cosmology (Inflation, dark matter,)
- Neutrinos and Cosmology (Nucleosynthesis, Leptogenesis, ...)
- Antimatter in our Universe (CP symmetry)

- CMB data confirm 3, and only 3, flavors for neutrinos
- Primordial deconfined quarks and gluons phase reproduced in laboratory
- Supernova explosion with 98% emission of neutrinos
- Very-high-energy gamma ray sources

An many others.





I L **A** N C E



International Laboratory for **A**strophysics,
Neutrino and **C**osmology Experiments



Exploration of Particle Physics
and Cosmology with Neutrinos



UTokyo Strategic Partnerships Project
Paris **G**randes **É**coles **T**eam

Many thanks to The University
of Kyoto for hosting our conference

No conference dinner due to
University of Kyoto Covid restrictions

Mon 27	16°/5°		Partly Cloudy
Tue 28	18°/5°		Sunny
Wed 29	18°/7°		Mostly Sunny
Thu 30	20°/10°		Partly Cloudy
Fri 31	21°/11°		Partly Cloudy

Kajita-san, Nakaya-san and I would like to dedicate this conference
to the memory of Stavros Katsanevas

1953 - 2022



EGO, Italy, September 2022



Kyoto University and Physics Department



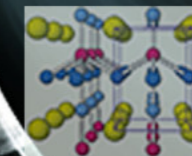
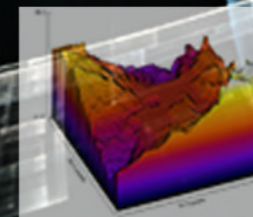
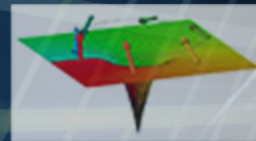
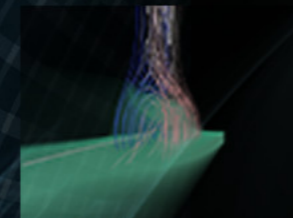
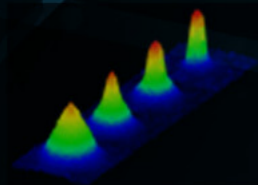
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京都大学 大学院理学研究科
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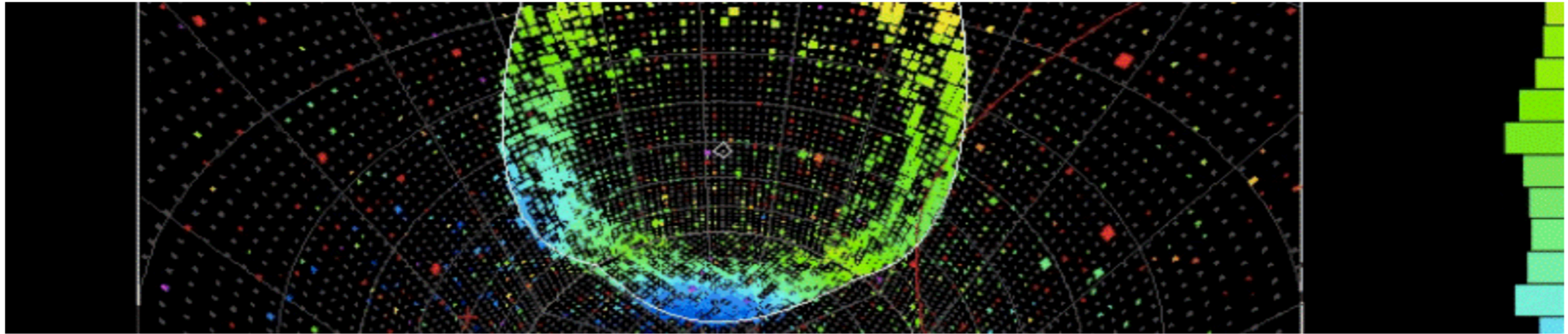
物理学第一分野・物理学第二分野・宇宙物理学分野

Division of Physics and Astronomy, Graduate School of Science, Kyoto University



- http://www.scphys.kyoto-u.ac.jp/en/index_e.html

Exploration of Particle Physics and Cosmology with Neutrinos

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Neutrino Pamphlet

[Click](#)

Four-Frame-Comics

Super-Kamiokande and Bacteria

[Click](#)

What are the neutrinos?

[Click](#)

Introduction

Outline

Organization

Management group

Research projects

Publicly solicited

What's new

- | | | |
|------------|--------------------------|--|
| 2022-12-21 | workshop | <u>International Conference on the Physics of the Two Infinities will be held at Masukawa Hall, Kyoto University on 27-30 March 2023. [link]</u> |
| 2022-06-01 | award | Dr. M. Nakamura and Dr. T. Nakano (Nagoya University) received the Foundation for High Energy Accelerator Science 2021 Koshiba Prize. |
| 2022-04-27 | workshop | Vietnam School on Neutrinos 2022 will be held at ICISE center, Quy Nhon on 10-22 July 2022. [link] |
| 2022-03-02 | workshop | Exploration of Particle Physics and Cosmology with Neutrino Workshop |

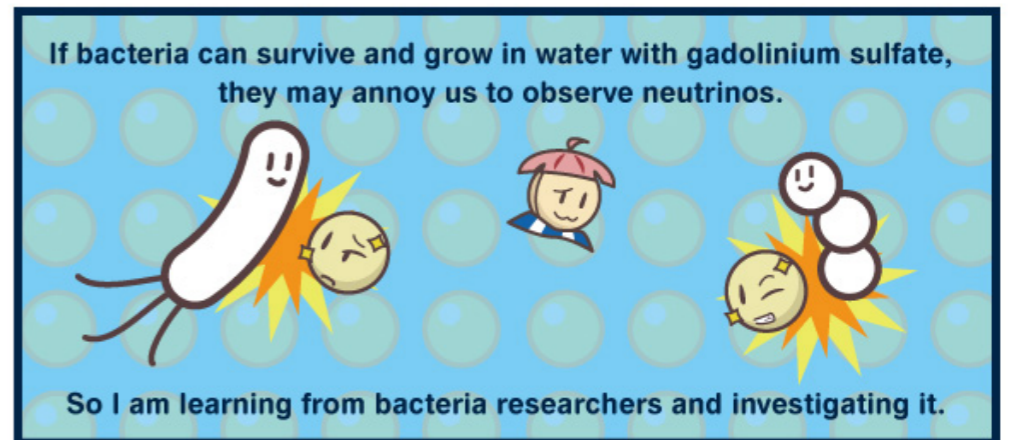
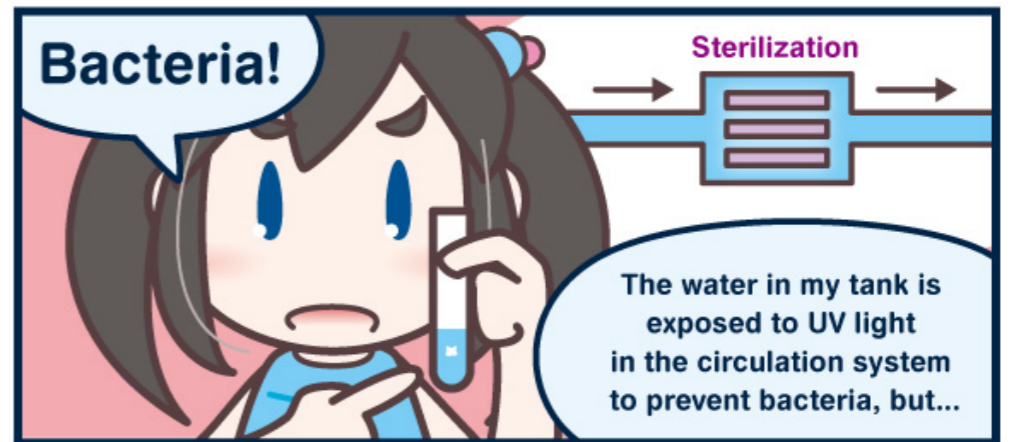
NEUTRINO!

Exploration of Particle Physics and Cosmology with Neutrinos

★ Unification and Development of the Neutrino Science Frontier ★



Super-Kamiokande and Bacteria



Exploration of Particle Physics and Cosmology with Neutrinos 2018.7~2023.3 (A01-04, B01-02, C01-02)

Report at the Neutrino Parallel session on Wednesday, March 29th.

