KMI/NITEP School 2026

Welcome!

Toru Iijima / Director KMI
March 9, 2026

Jointly organized by KMI and NITEP!

Kobayashi-Maskawa Institute
for the Origin of Particles and the Universe

NITEP
Nambu Yoichiro Institute of Theoretical and Experimental Physics

Nobel Prize in Physics 2008

- **Yoichiro Nambu** "for the discovery of the mechanism of spontaneous broken symmetry in subatomic physics"

- **Makoto Kobayashi** and **Hidetoshi Maskawa** "for the discovery of the origin of the broken symmetry which predicts the existence of at least three families of quarks in nature"

Photo: University of Chicago
Yoichiro Nambu
Prize share: 1/2

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Makoto Kobayashi
Prize share: 1/4

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Toshihide Maskawa
Prize share: 1/4

NITEP

Osaka Metropolitan University was established in 2022 through the merger of Osaka City University and Osaka Prefecture University.

Osaka City University was known to be the only university in Japan where Yoichiro Nambu taught as a professor before he left for the US. In 2013, the University conferred upon Professor Nambu the title of Special Emeritus Professor in recognition of his receipt of the 2008 Nobel Prize in Physics.

NITEP was established in 2018, bearing Professor Nambu's name. Guided by the spirit of Professor Nambu's contributions to physics, the institute pursues research across the full spectrum of the discipline.

As its name suggests, NITEP encompasses both theoretical and experimental physics, and its members conduct research in areas ranging from particle and astrophysics to condensed-matter physics.

KMI

The Kobayashi–Maskawa Institute for the Origin of Particles and the Universe (KMI) at Nagoya University was established in 2010 to explore new frontiers of modern physics beyond the Standard Model.

KMI recently established the Dark Matter International Research Center (**DarMa**) in April 2025, aiming to catalyze worldwide collaboration across theory, astrophysics, and particle-physics experiments through workshops and joint research.

Kobayashi-Maskawa Institute
for the Origin of Particles and the Universe

History

Physics at Nagoya University

1955 Sakata Model for hadrons

1962 Maki-Nakagawa-Sakata Matrix

1965 The first X-ray rocket in Japan

1971 Kyoshi Niu found charm quark event in CR.

(1974 Charm quark was detected at SLAC &BNL)

1973 Kobayashi-Maskawa matrix

2000 Tau neutrino discovery (DONUT at Fermilab)

2001 CP symmetry breaking (Belle at KEKB factory)

2008 Nobel prize for Kobayashi-Maskawa matrix

2010 Establishment of KMI

2010 Observation of a first tau neutrino (OPERA)

2012 Discovery of Higgs particle

2015 The fifth tau neutrino (OPERA)

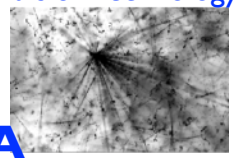
Shoichi Sakata

Sachio Hayakawa

CKM

PMNS

Unique Nuclear Emulsion Technology



Belle

OPERA

Crossover of Theory x Exper./Obs. & Particle x the Universe

& Professors x Students

Note: Sachio Hayakawa was at OCU (1949-1950) and later moved to Nagoya. He is the father of experimental groups at Nagoya.

Raising International Collaborations

- KMI Symposium
  - Bi-annual meeting to survey physics highlights + topical hot issues
  - Showcase of KMI researches and activities by young scientists (incl. grad students)
  - KMI 2025 in March 5-7, 2025

- KMI School
  - School for a dedicated hot topic
  - Lectures, hand-on exercise and seminars
  - Invite young students & PD from all over the world.

- KMI visitors to invite foreign researchers
- Dispatch young researchers to overseas researches

KMI School

- In 2018 we launched the annual KMI School, at which distinguished researchers deliver lectures on a focused theme each year.
- The School is intended for graduate students and young postdoctoral researchers; we warmly encourage the young members of your groups to participate.

- 2018: Dark Matter
- 2019: Particle-Antiparticle Asymmetry in the Universe
- 2020: Machine Learning in Particle and Astrophysics
- 2022: Statistical Data Analysis and Anomalies in Particle Physics and Astrophysics
- 2024: Quantum Computing and Technology for Particle Physics and Astrophysics

KMI/NITEP School 2026

- Dark Matter — from Ultra Light to Super Massive —
- Lecturers
  - John Ellis *overview*
  - Akira Miyazaki *axion search*
  - Hidetoshi Otono *accelerator search*
  - Alejandro Ibarra *particle dark matter*
  - Masaki Yamashita *direct detection + experimental technology*
- Seminar speakers
  - Kohei Hayashi *DM in the Milky Way*
  - Elisa Ferreira *ultra light DM*
  - Kazunori Kohri *PBH*
- Poster session by participants
  - >30 posters!

Please Enjoy!