



Welcome to the 3rd KMI school “Machine Learning”

Junji Hisano
Director of KMI, Nagoya Univ.



Introduction to

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

in Nagoya University

Junji Hisano
Director of KMI, Nagoya Univ.

History

Physics at Nagoya University



Sakata model
MNS matrix

Shoichi Sakata



X-ray astronomy

Sachio Hayakawa



Nuclear emulsions

Kiyoshi Niu



Kimio Niwa

Kobayashi-Maskawa Matrix

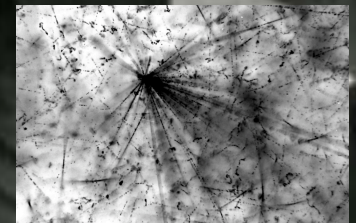
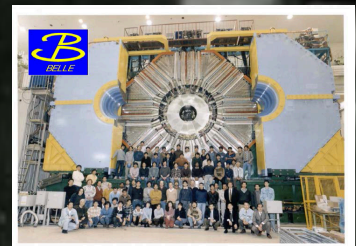


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Makoto Kobayashi



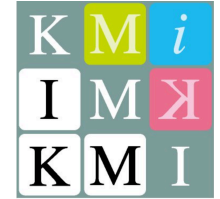
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Toshihide Maskawa

- 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)



Our Mission in KMI

Shed Light on the Dark Universe



— Dark Energy

— Dark Matter

— Missing anti-matter

Beyond Kobayashi-Maskawa.

Organization of KMI



Internal Collaborations
in Nagoya University

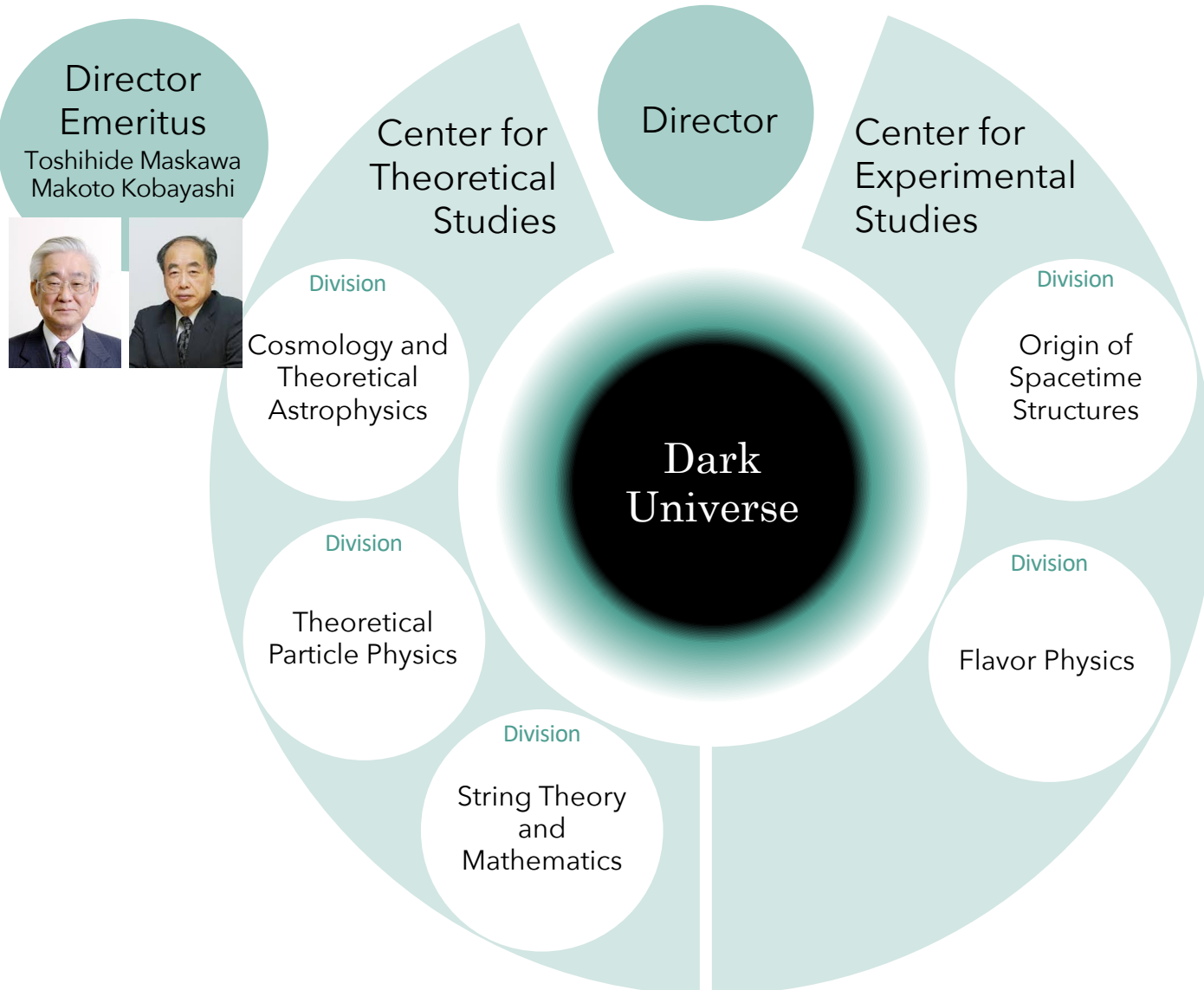
**Graduate School
of Science**

**Tau Lepton Physics
Research Center**



**Graduate School
of Mathematics**

**Institute for Space-Earth
Environmental Research**



KMI's Three rings

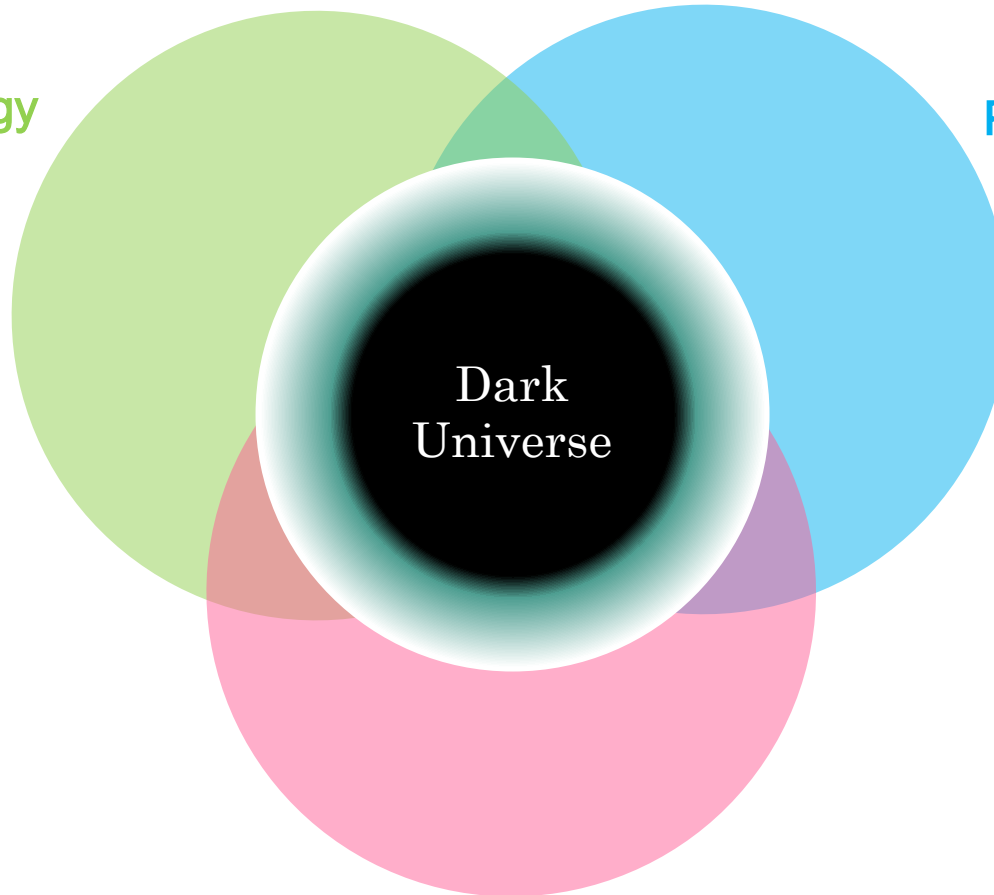


New Particle
Phenomenology

Astro-particle
Phenomenology

Dark
Universe

Integrative
Theoretical Researches

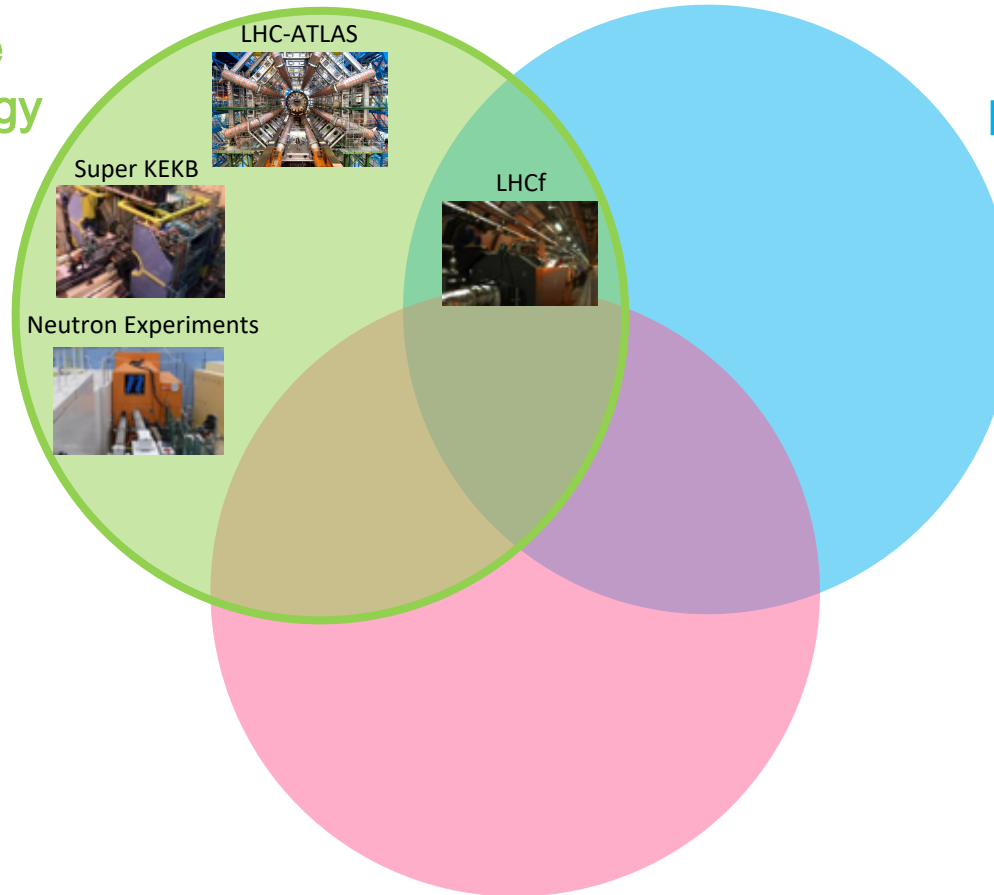


KMI's Three Rings

New Particle Phenomenology

New Particle
Phenomenology

Astro-particle
Phenomenology



Toru
Iijima



Mitsuhiro
Nakamura



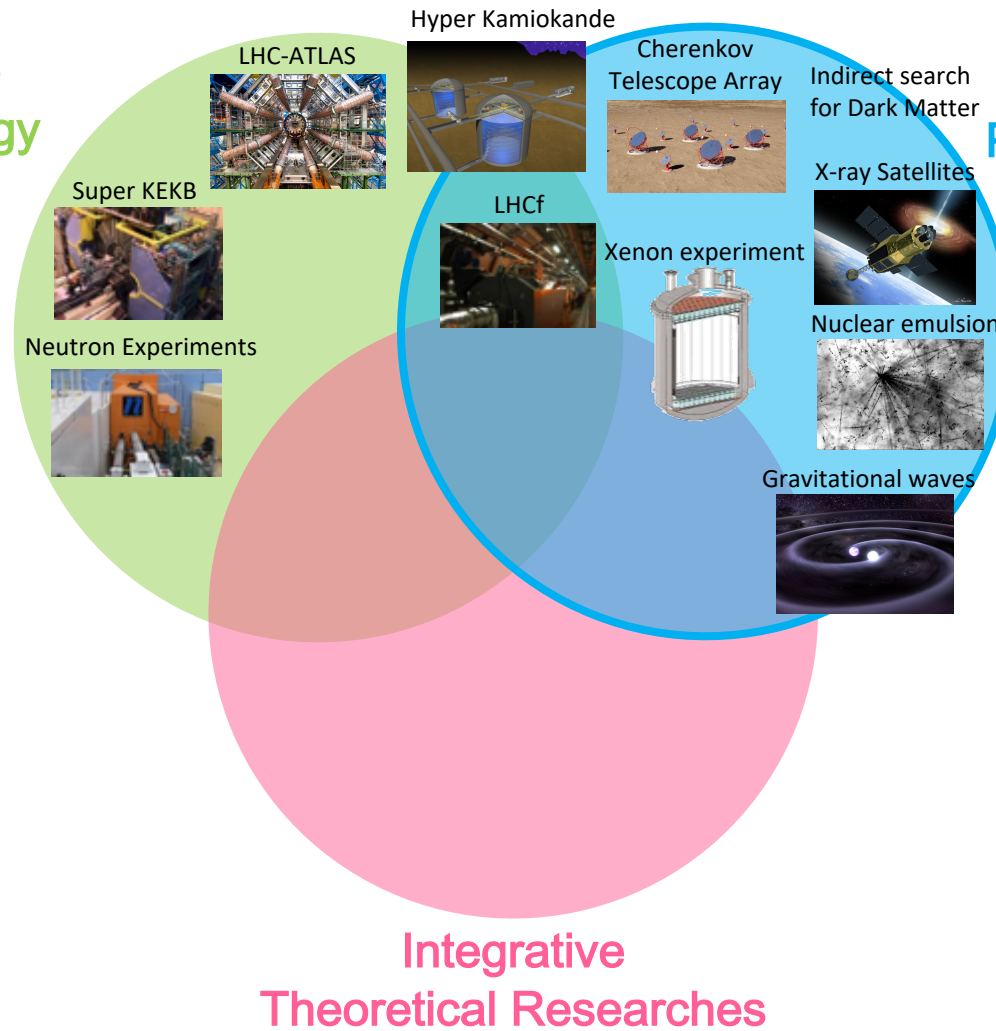
Yoshitaka
Itow

KMI's Three Rings

Astro-particle Phenomenology

New Particle
Phenomenology

Astro-particle
Phenomenology



Toru
Iijima



Mitsuhiro
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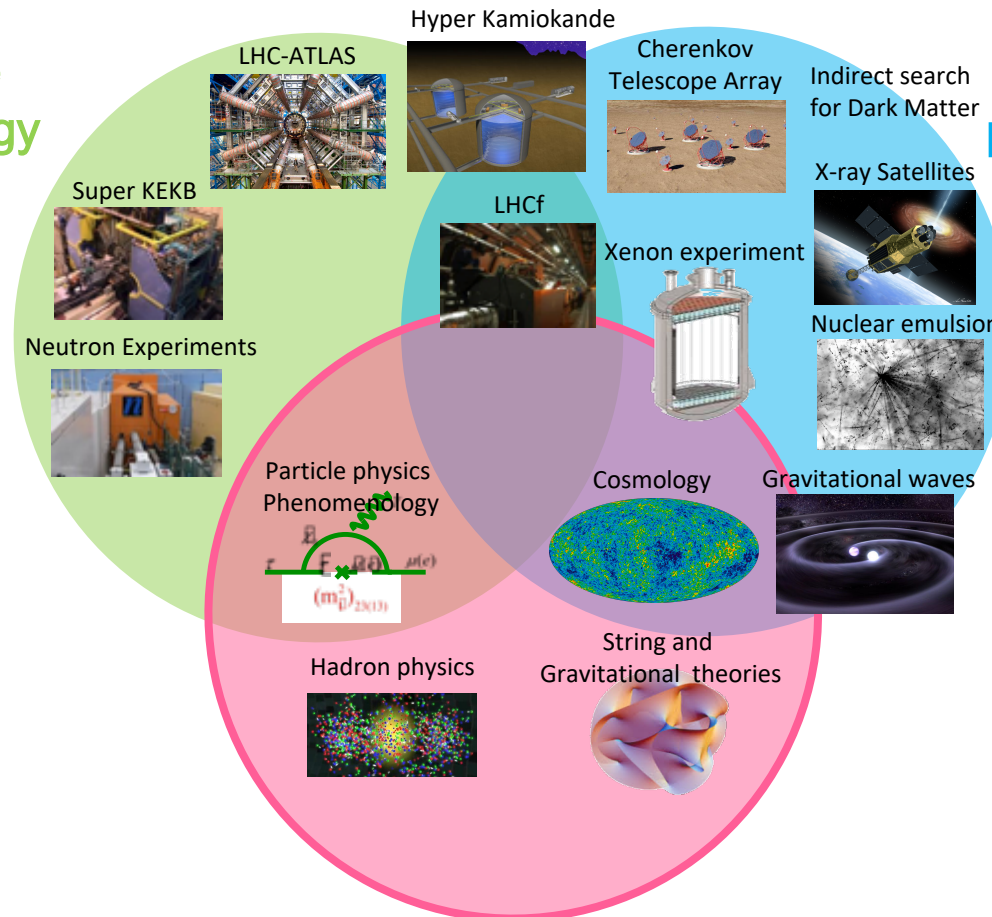
Yoshitaka
Itow

KMI's Three Rings

Integrative Theoretical Researches

New Particle
Phenomenology

Astro-particle
Phenomenology



Junji
Hisano



Hiroaki
Kanno



Shinichi
Nojiri



Tetsuya
Shiromizu



Naoshi
Sugiyama



Masaharu
Tanabashi

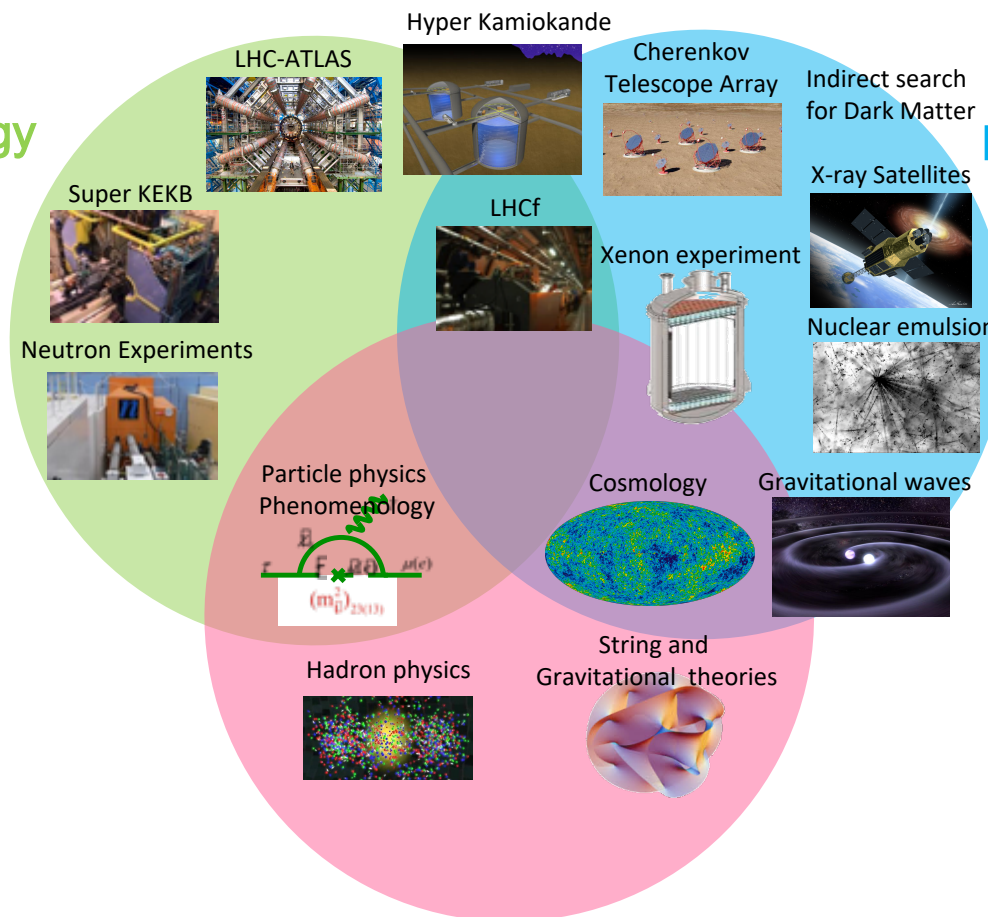
Integrative
Theoretical Researches

KMI's Three rings



New Particle
Phenomenology

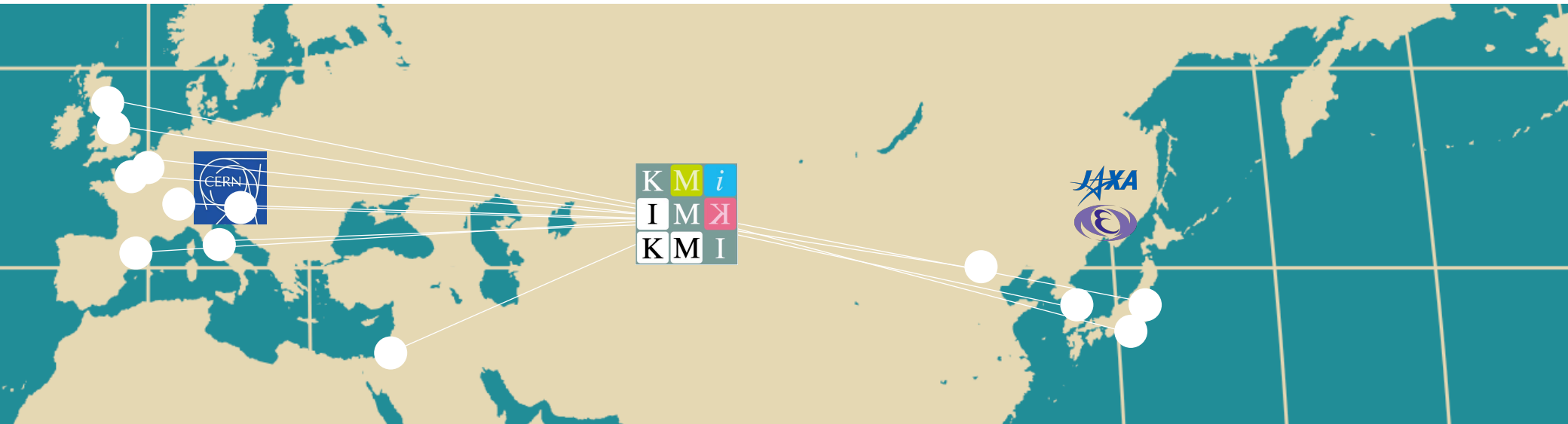
Astro-particle
Phenomenology



Integrative
Theoretical Researches

KMI as a Research Hub

International and Interdisciplinary



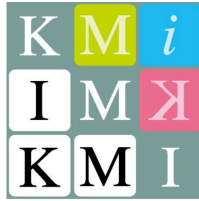
8 International Partner Institutions:

Tel Aviv University, School of Physics and Astronomy
Institute of Physics and Applied Physics (IPAP)
Yonsei University Jozef Stefan Institute
Higgs Centre for Theoretical Physics, The University of Edinburgh
Institute of Space Studies of Catalonia (IEEC)
Institute of Theoretical Physics, The Chinese Academy of Sciences
National Institute for Nuclear Physics, Padova Division
The University of Naples, Federico II, Department of Physics Ettore Pancini

Collaborative Institutions:

University of Leicester
Le Centre CEA de Saclay
Institut de Physique Nucléaire D'orsay
Gran Sasso Science Institute
CERN, JAXA, KEK

KMI Symposium and KMI School



- KMI Symposium (2011, 2013, 2017, 2019)
 - Bi-annual meeting ; survey physics highlights + topical hot issues
 - Showcase of KMI researches and young efforts
- KMI School (2018, 2019, 2020)
 - Newly started activity since 2018
 - Annual school for a dedicated hot topic
 - Invite young students & PD all over the world



**dark matter
(2018)**



**Baryon asym.
(2019)**



**Machine learning
(2020)**



www.kmi.nagoya-u.ac.jp



Please enjoy the 3rd KMI school
“Machine Learning”