

TGSW 2017  
session 8-8



4th international workshop  
on  
**Universe Evolution and Matter Origin**

to shed light on the darkness in the History of the Universe  
through interdisciplinary collaboration of particle physics, nuclear physics and astrophysics.

1st workshop held in 2014.

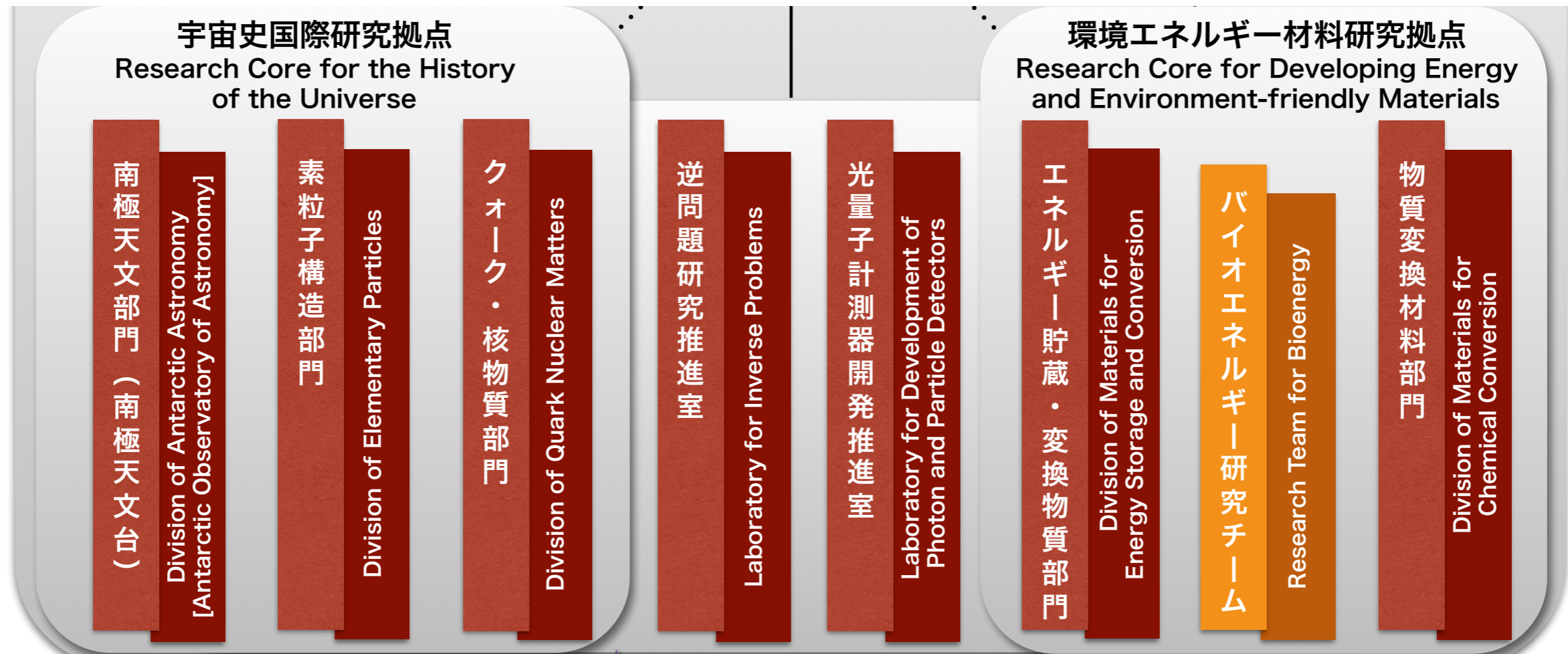
Have been hosted by the *Research Core for the History of the Universe* at



Center for Integrated Research  
in Fundamental Science and Engineering



# Center for Integrated Research in Fundamental Science and Engineering



To lead breakthroughs by interdisciplinary collaborations in and between the Cores, and to act as an activity center applying for new external budgets.

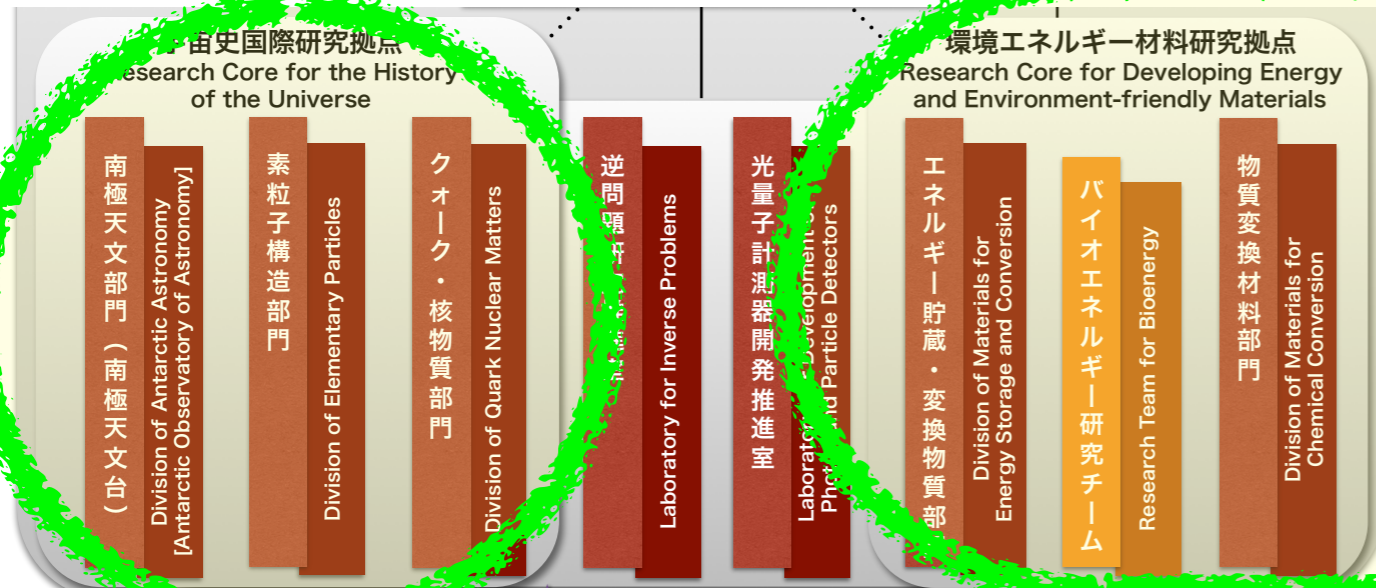
Cores are positioned as seeds of international research centers in the next stage.


In 2016 and 2017, our applications of national budgets to construct a new international research center for HoU and that for Materials Science were approved.

=> UT accelerated reformulation of the centers, much earlier than initially supposed.

# Reformulation of centers and labs at the Faculty of Pure and Applied Sciences Oct. 2017

 Center for Integrated Research  
in Fundamental Science and Engineering



 Tsukuba Research Center for  
Interdisciplinary Materials Science

Special Lab.  
for Power-Electronics

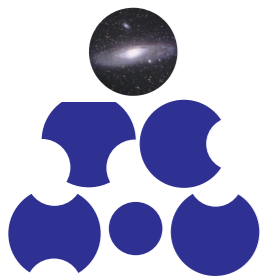


**Tomonaga Center  
for the History of the Universe**

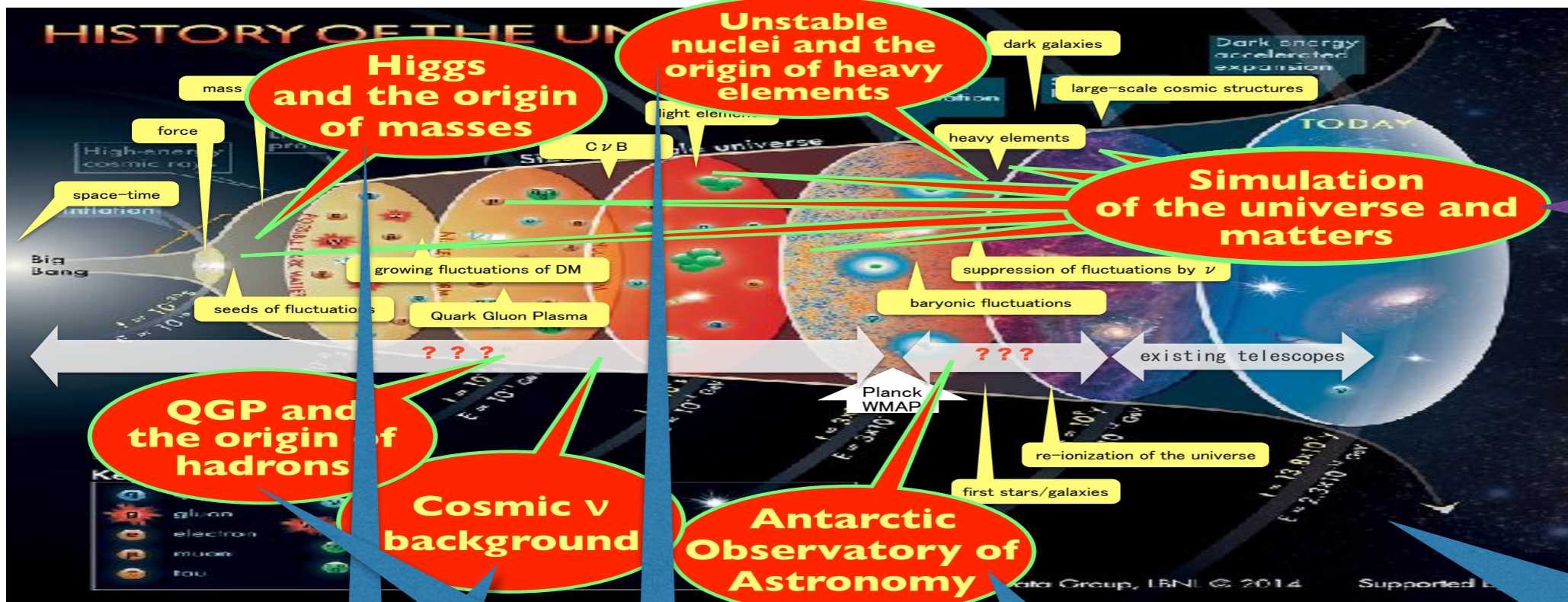


**Tsukuba Research Center  
for Energy Materials Science**

More sharply focused on each issue  
to strengthen centripetal forces as a hub of international collaborations.



# Tomonaga Center for the History of the Universe

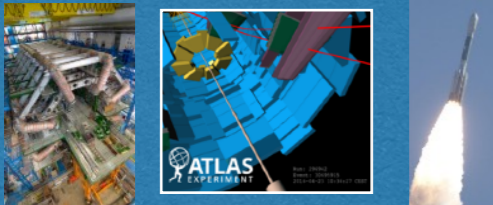



**Center for Computational Sciences**





## Division of Elementary Particles

- Higgs precision study by ATLAS experiment
- Detection of cosmic neutrino background by COBAND experiment
- Theory of quantum gravity and superstrings



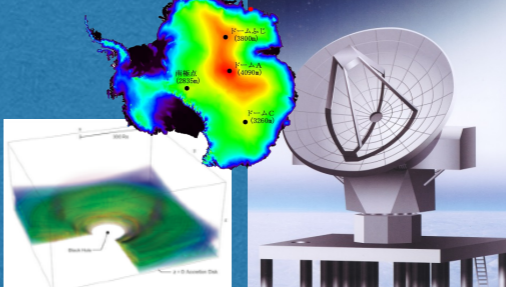
## Division of Quark Nuclear Matters

- QGP study by ALICE and STAR experiments
- Study of unstable nuclei by RI-beam factory
- QCD simulations towards QGP and nuclear matters




## Division of Antarctic Astrophysics

- Construction of Antarctic Observatory of Astronomy towards dark galaxies
- Simulation of universe and galaxies



## Division of Photon and Particle Detectors

- Development of PPD by superconducting and SOI technologies



**Tsukuba Research Center for Energy Materials Science**

TIA-ACCELERATE, ...

# Tomonaga Center for the History of the Universe

Design Office of Integrated Research

Divisions of TCHoU

## Div. for Development of Photon and Particle Detectors

The division functions as a base of development of photon and particle detectors, deployable for the fundamental science and engineering researches of TCHoU and other related activities, and pursues integrated research of the detector development in collaboration with other research institutions in Tsukuba area.

**Members:** K. Hara (L.), S. Esumi, Y. Takeuchi, S-H. Kim  
**Member adjunct:** E. Nishobori, S. Tomita, T. Kondo

Superconducting Detector, SOI Pixel Detector, new technologies

- University base for TIA-ACCELERATE Photon and Particle Sensing Square
- Collaboration with other research institutions in Tsukuba area

collaboration

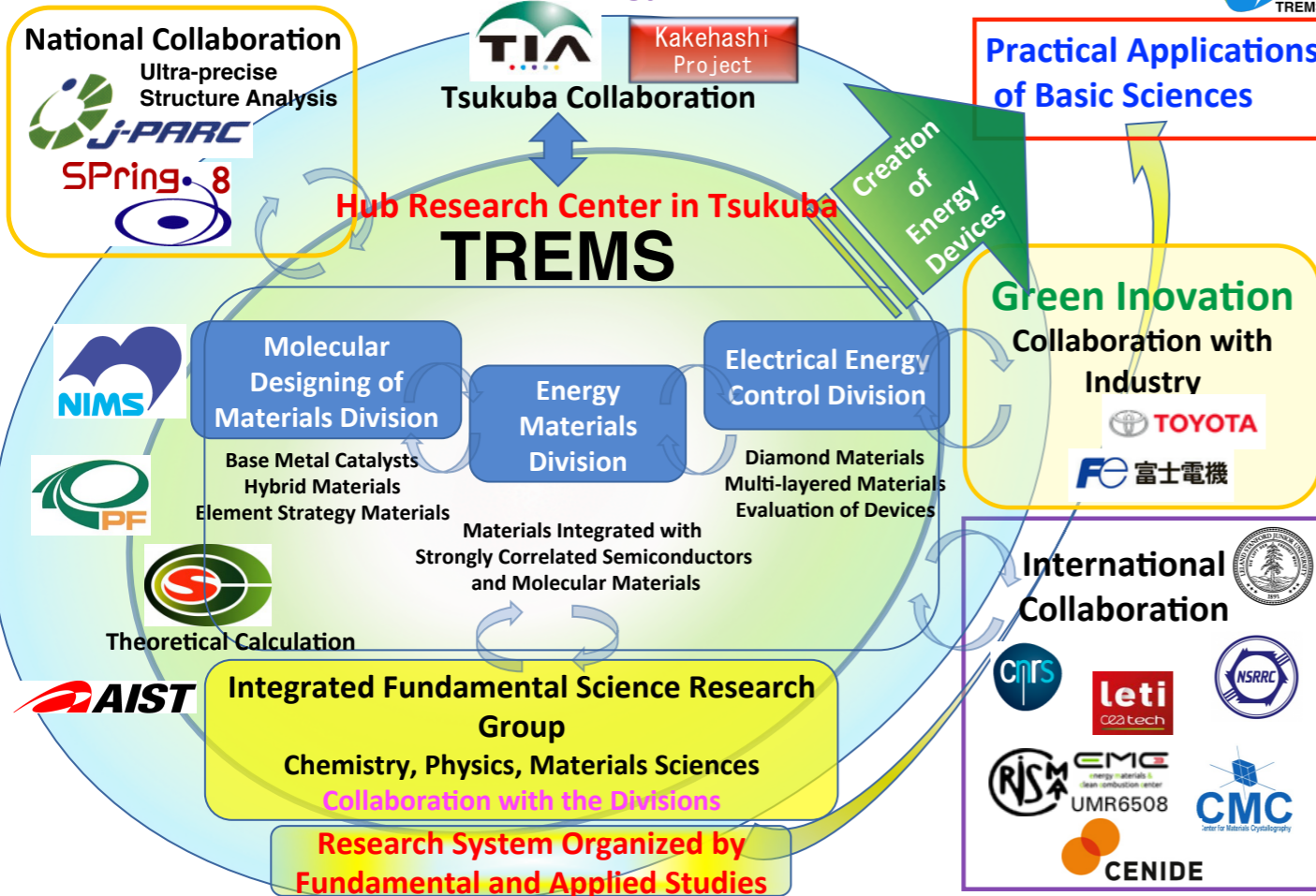
Divisions of TREMS

TIA-ACCELERATE Initiative for photon and particle detector application to industry

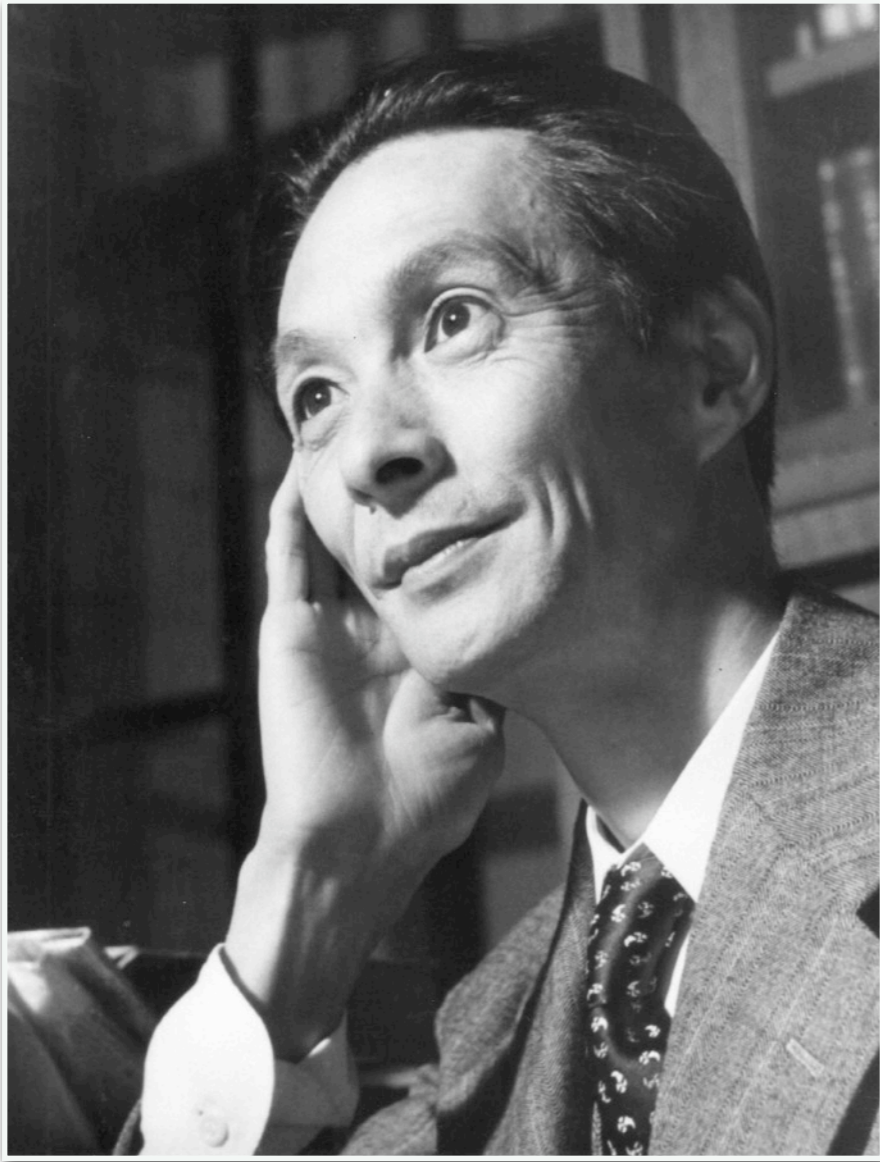
KEK Detector Technology Project  
 AIST CRAVITY·3D technology

## Tsukuba Research Center for Energy Materials Science (TREMS)

Creation of Novel Energy Materials and Devices



We keep collaborative communications with materials scientists to develop most advanced detectors for HoU.



# SIN-ITIRO TOMONAGA

1906-1979

Basic contributions to the foundation of

- relativistic quantum field theory
- renormalization theory
- theory of collective motions

=> Nobel prize in Physics 1965  
(2nd Nobel laureate from Japan)



A founder of physics institutes at Tsukuba.



Standing exposition at the Tomonaga Memorial Room  
in the University Gallery, Univ. of Tsukuba

Anyway, the Tomonaga Center will keep hosting this stimulating series of workshops on Universe Evolution and Matter Origin.

Please enjoy the workshop and the City of Tsukuba!