



TSUKUBA GLOBAL SCIENCE WEEK

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TGSW 2022

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 [Session list](#) »



ONLINE

5-9

Universe Evolution and Matter Origin

 Session Organizer TAKEUCHI Yuji, Tomonaga Center for the History of the Universe, Faculty of Pure and Applied Sciences, University of Tsukuba, Associate Professor

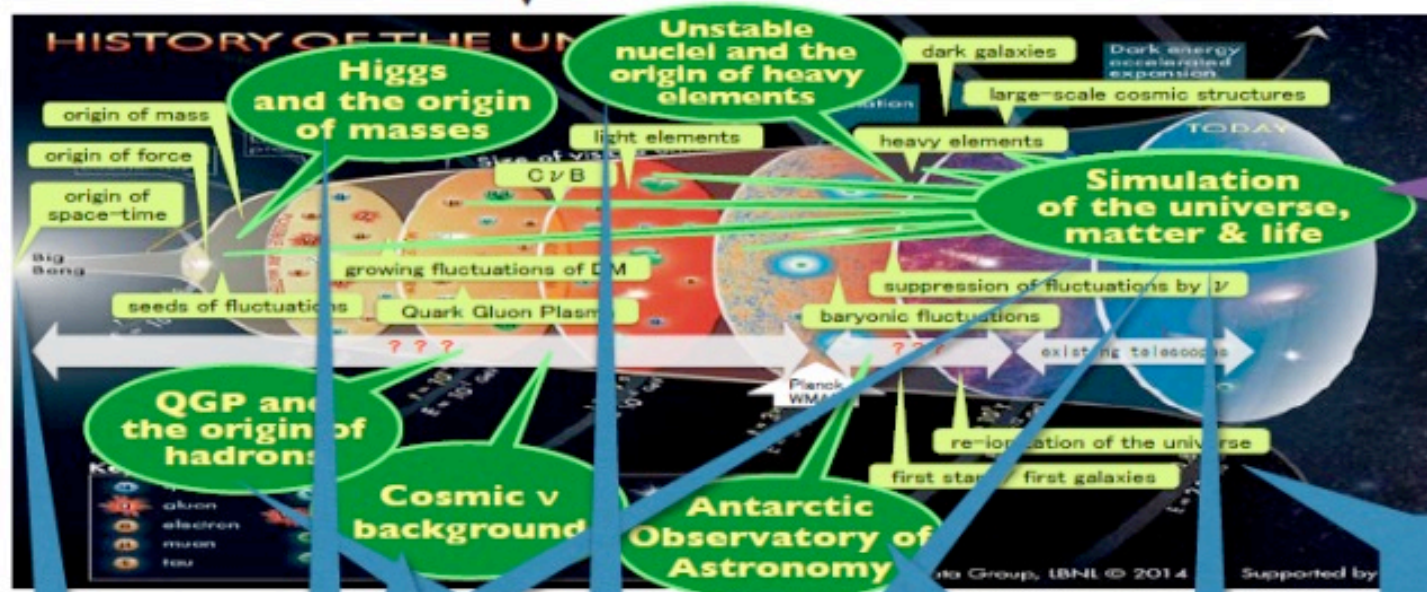
- **Tomonaga Center for the History of the Universe,**
Faculty of Pure and Applied Sciences,
University of Tsukuba



Tomonaga Center for the History of the Universe



筑波大学
University of Tsukuba



Center for Computational Sciences



Division of Photon and Particle Sciences

History of the Universe from Big Bang to the present state

- Birth of the universe
- Origin of matter
- Formation of galaxies, stars and planets

• Higgs p
ATLAS ex
• Detecti
neutrino
COBAND
• Theory
and super

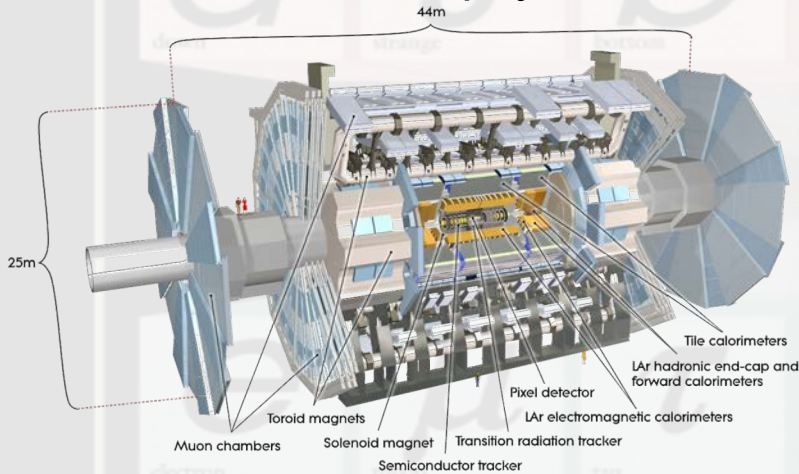


**Tsukuba Research Center
for Energy Materials Science**
TIA-ACCELERATE, ...

Div. of Elementary Particles

ATLAS Experiment

- Particle physics at LHC collider.
- Wide range of particle physics studies including precision measurement of Standard Model, Higgs boson, and searches for new physics.

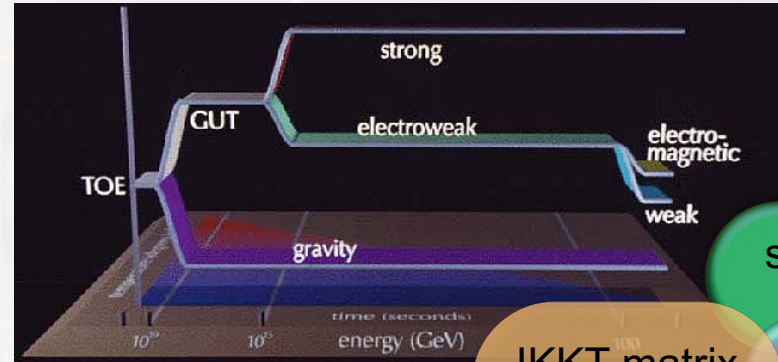


COBAND

- Search for cosmic background neutrino decay.
- In preparation of a sounding rocket experiment with FIR single-photon spectrometer in cryogenic telescope.

Superstring theory

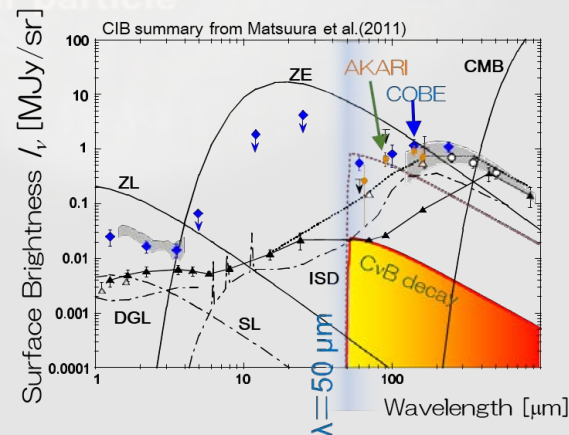
- Quantum theory including gravity.
- Expected to describe birth of the universe.



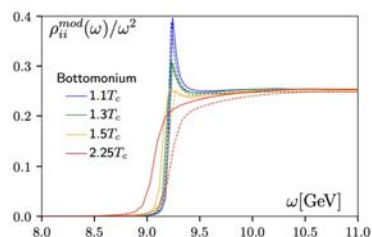
string field theory

IKKT matrix model

AdS/CFT

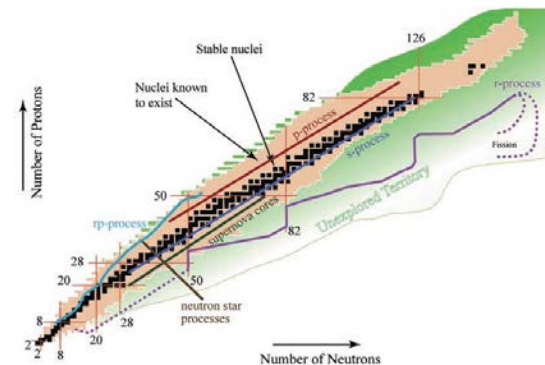
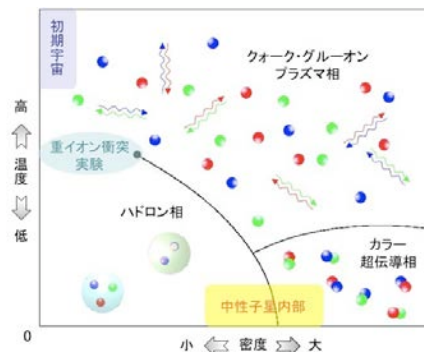
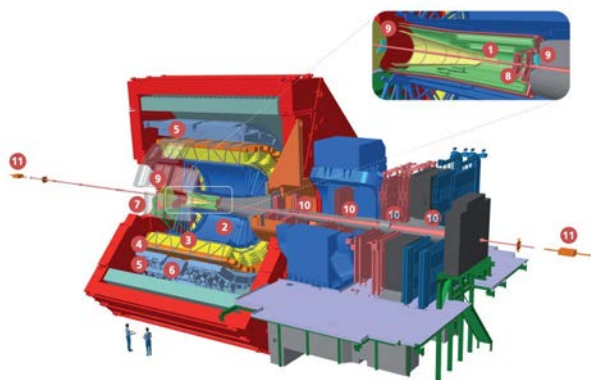


Researches in Division of Quark-Nuclear Matters

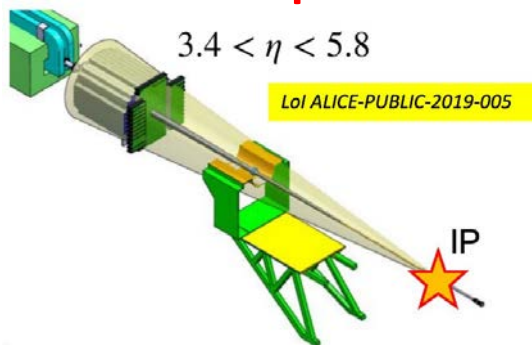


Lattice QCD calc.

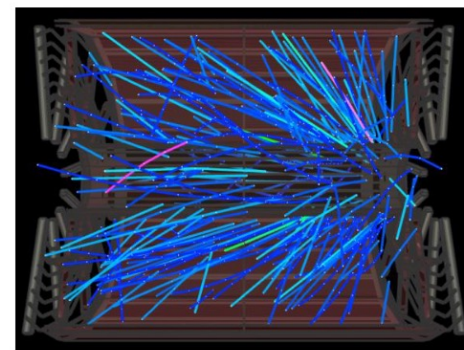
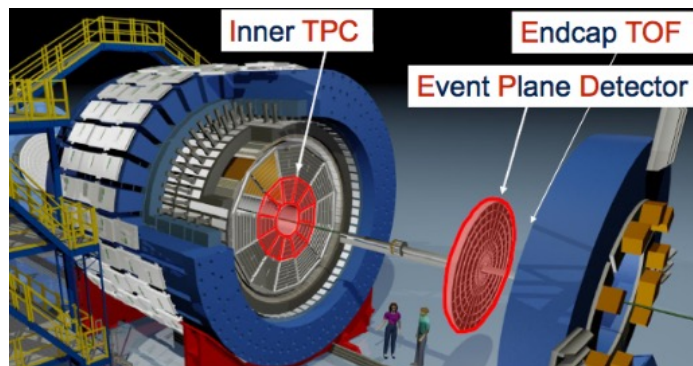
RIBF and Nuclear Synthesis



ALICE exp. and FoCal



STAR exp. and Fix. Target

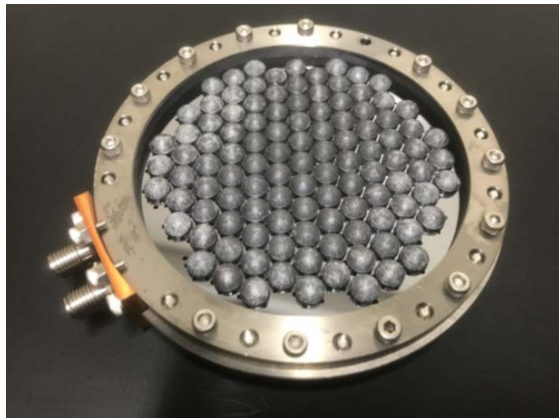


Division of Antarctic Astrophysics



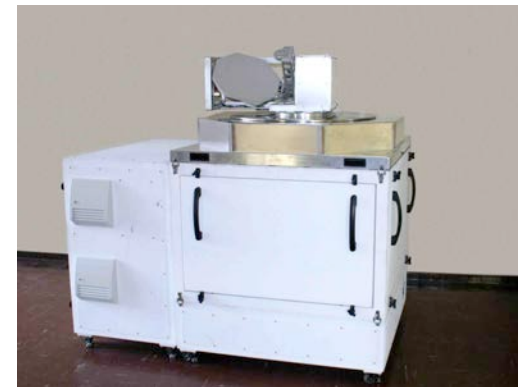
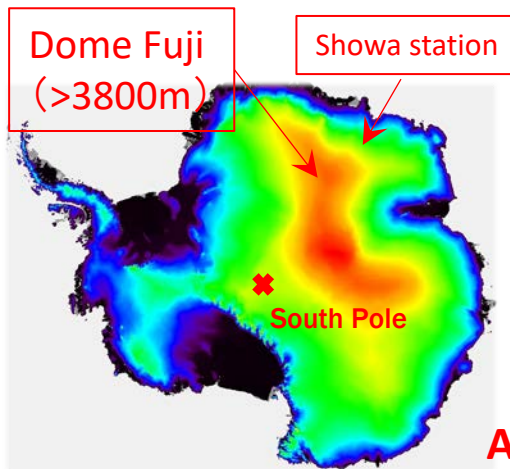
Antarctic 10-m class Terahertz Telescope

- Wide field of view
- Formation and evolution of galaxies



MKID camera for Nobeyama 45-m telescope

- Star forming regions in the Milky way
- Prototype of wide field of view camera



Antarctic 30-cm Submm Telescope

- Evolution of interstellar gas and star formation process
- To Dome Fuji in 2024



Observations with NRO 45-m, ALMA, SUBARU, etc.

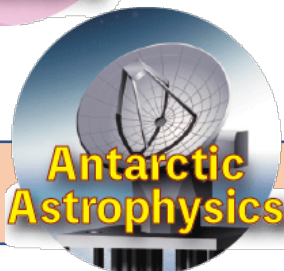
- Distant galaxies
- Nearby galaxies
- Milky Way etc.

Division of Photon and Particle Detectors

Division leader: Kazuhiko Hara

6 members from 3 divisions + 5 collaborative members

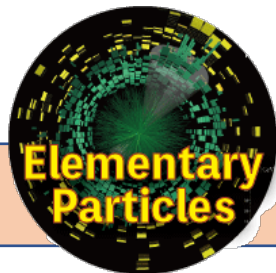
Photon
and Particle
Detectors



Antarctic
Astrophysics

MKID

low temp.
telescope optics

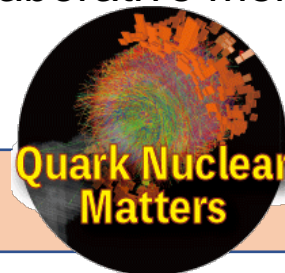


Elementary
Particles

COBAND

ATLAS

silicon
detectors

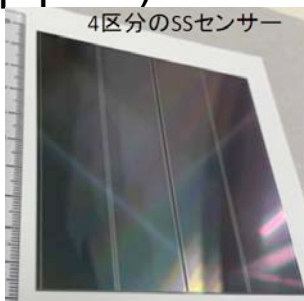


Quark Nuclear
Matters

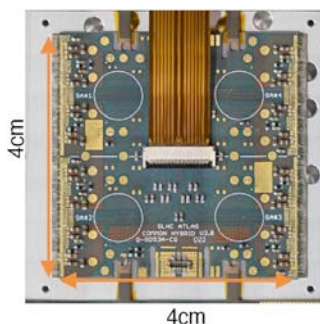
ALICE PHENIX/STAR

◆ Design/construction of silicon detectors (strip/pixel) for HL-LHC ATLAS

Barrel strip
sensor
10cm □



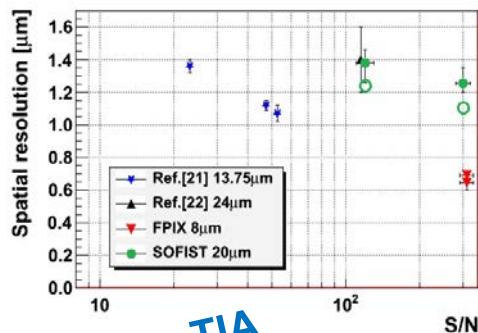
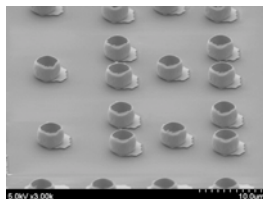
Barrel pixel
module
4cm □



ATLAS

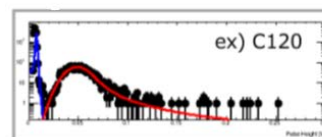
◆ SOI monolithic pixel sensors

2μmφ Au
bump



TIA

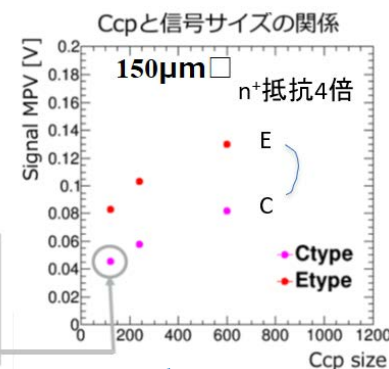
◆ AC-LGAD as 4-D tracker for future experiments



US-Japan

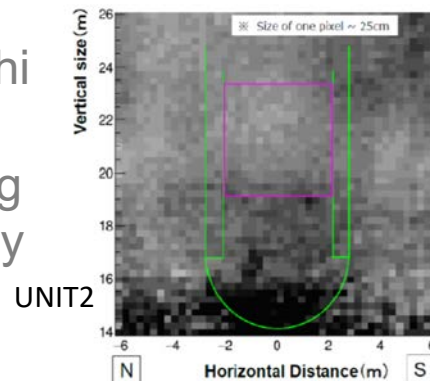
FJPPL

TIA




◆ Fukushima Daiichi nuclear debris investigated using muon radiography

TIA




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