

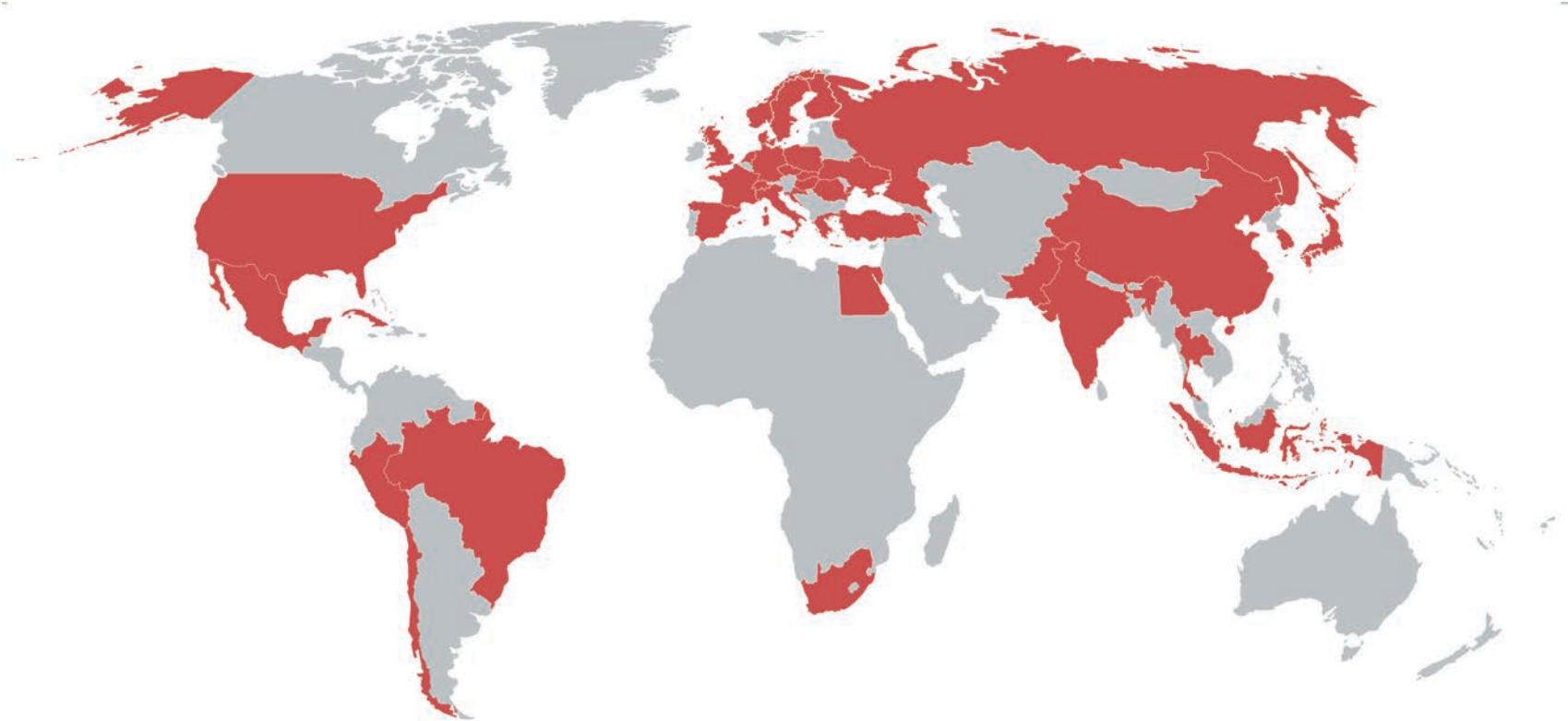


# **JAPAN WITHIN THE ALICE COLLABORATION**



# THE ALICE COLLABORATION

**37 COUNTRIES – 157 INSTITUTES – 162'456 KCHF CAPITAL COST**



# THE ALICE COLLABORATION

## History of the ALICE Experiment:

1990-1996 Design

1992-2002 R&D

2000-2010 Construction

2002-2007 Installation

2008 -> Commissioning

4 TP addenda along the way:

1996 Muon spectrometer

1999 TRD

2006 EMCAL

2007 DCAL

2012 Lol for the Upgrade

2012-2014 R&D

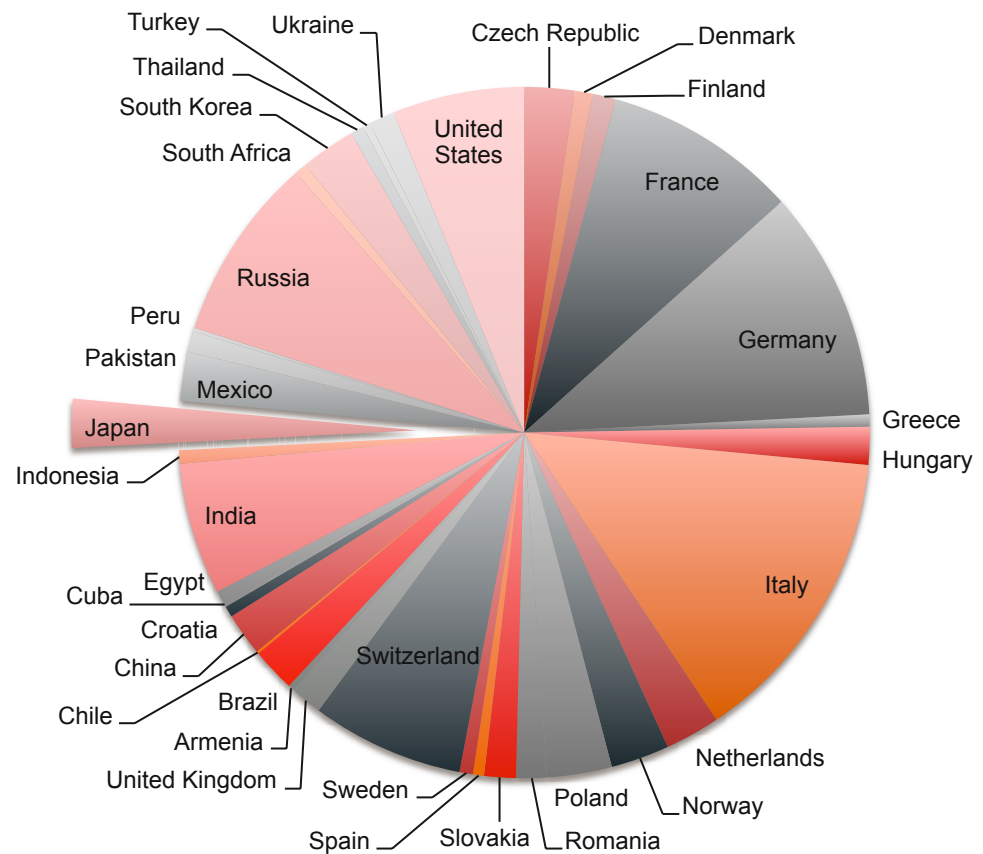
2014-2016 Procurement/Fabrication

2016-2017 Integration, pre-commissioning

2018-2019 Installation, commissioning

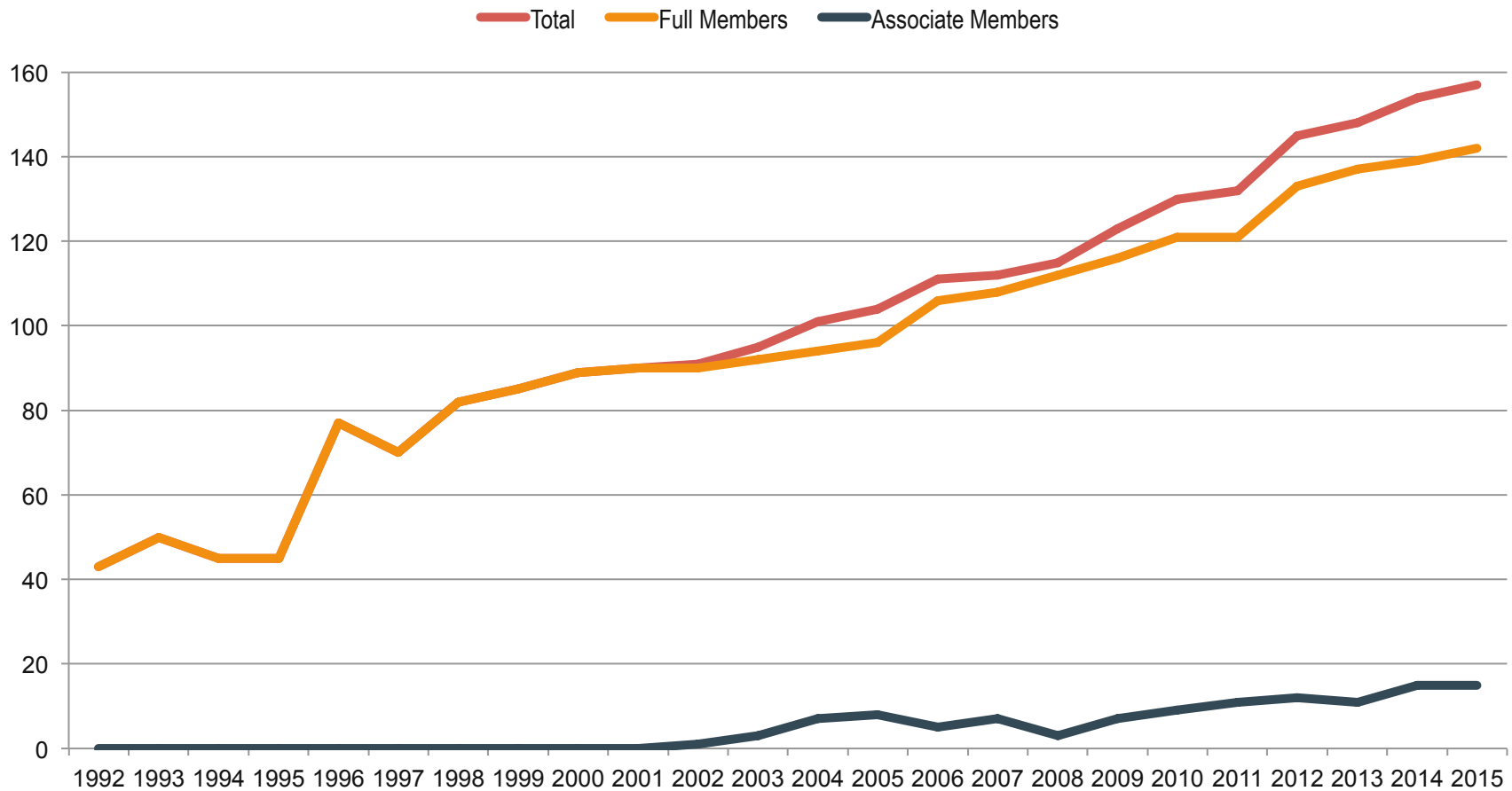
2019-2020 Full deployment of DAQ/HLT

## MORE THAN 1500 MEMBERS



# PARTICIPATING INSTITUTES (1992-2015)

## Number of participating institutes in ALICE



# JAPAN COLLABORATORS

## 41 PEOPLE COMING FROM 5 INSTITUTES

Source: ALICE Collaboration data base Jan. 1<sup>st</sup> 2015

Full members since October 2006

- Hiroshima University
- University of Tokyo (CNS)
- University of Tsukuba

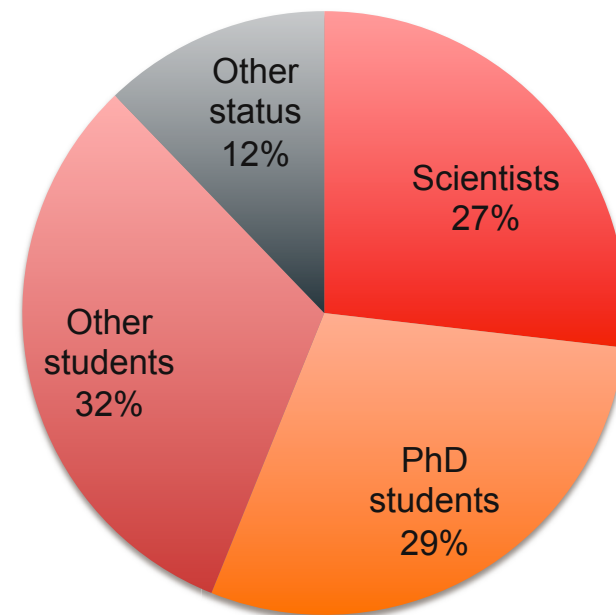
Full member since October 2014

- Nagasaki Institute of Applied Sciences

Associate member since September 2003

- The Institute of Physical and Chemical Research (RIKEN), Wako-shi

### Collaborators by status



## JAPAN REPRESENTATIVES

### **Toru SUGITATE**

- ✓ Hiroshima University Team Leader
- ✓ PHOS Deputy Project Leader
- ✓ Member of the Financial Board and Collaboration Board
- ✓ Member of the National Computing Board
- ✓ Member of the Conference Committee
- ✓ Link person ALICE – Japan

### **Kenta SHIGAKI**

- ✓ MFT detector control system responsible

### **Hideki HAMAGAKI**

- ✓ University of Tokyo Team Leader
- ✓ Deputy Chair of the Collaboration Board
- ✓ Member of the Management Board
- ✓ Member of the Editorial Board

### **Taku GUNJI**

- ✓ Low mass di-electron Physics Analysis Coordinator

### **Yasuo MIAKE**

- ✓ University of Tsukuba Team Leader
- ✓ Member of the Collaboration Board

### **Tatsuya CHUJO**

- ✓ EMCal/ DCal Deputy Project Leader

### **Oliver BUSCH**

- ✓ Jet Physics Working Group Convenor

### **Ken OYAMA**

- ✓ Nagasaki Institute of Applied Science Team Leader
- ✓ Member of the Collaboration Board

### **Hideto ENYO (associate member)**

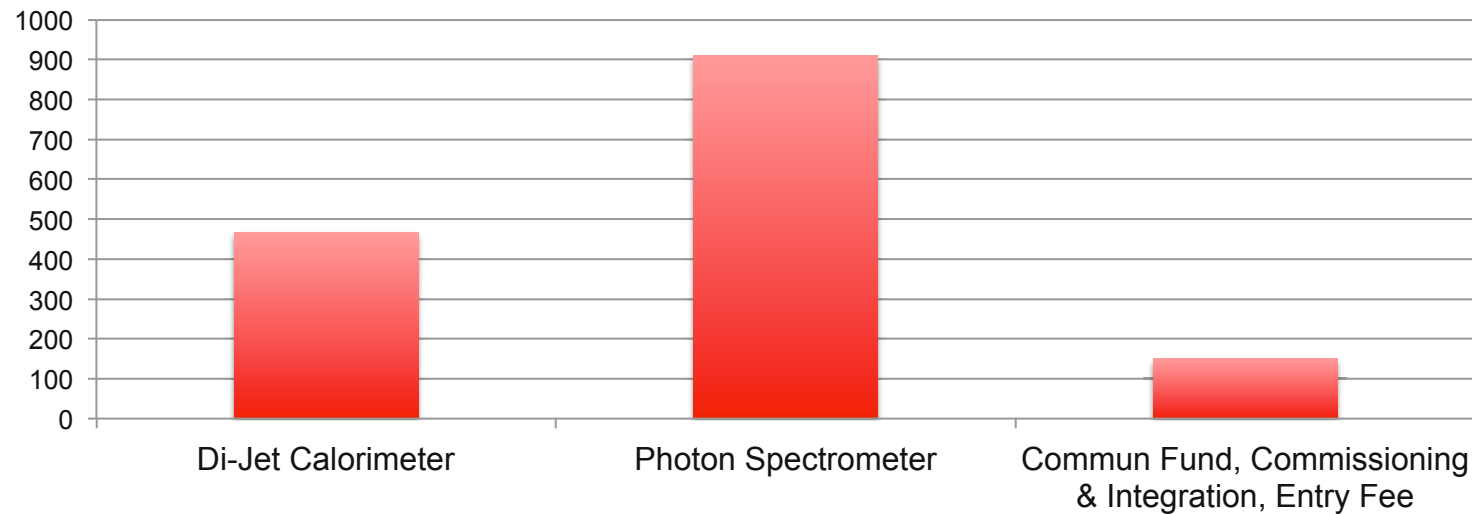
- ✓ RIKEN Team Leader
- ✓ Member of the Collaboration Board

## JAPAN FINANCIAL CONTRIBUTION (1/3)

FUNDING AGENCY: JAPANESE MINISTRY OF EDUCATION, CULTURE, SPORTS,  
SCIENCE AND TECHNOLOGY (MEXT)

### Contribution to the Construction in kCHF

Total: 1'527 kCHF (CERN-RRB-2015-034)





## **JAPAN FINANCIAL CONTRIBUTION (2/3)**

**FUNDING AGENCY: JAPANESE MINISTRY OF EDUCATION, CULTURE, SPORTS,  
SCIENCE AND TECHNOLOGY (MEXT)**

Contribution to the 2015 Maintenance & Operation budgets (CERN-RRB-2014-103-1)

Category A: 113.6 kCHF for 10 scientists

Category B: 10.0 kCHF to the PHOS and EMCal/DCal



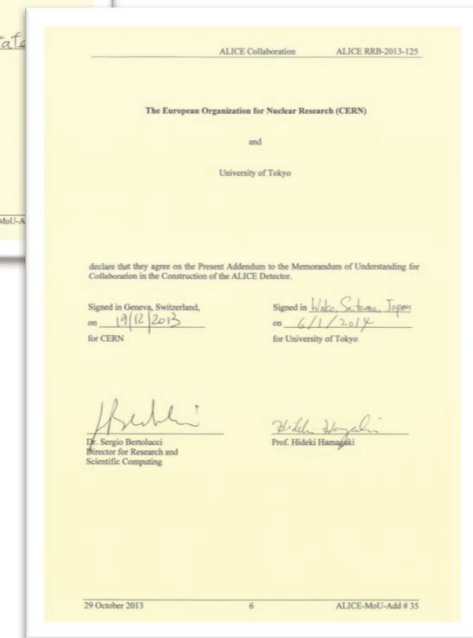
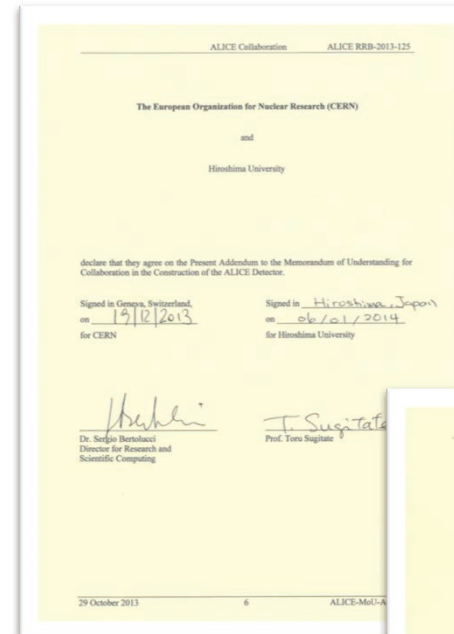
## JAPAN FINANCIAL CONTRIBUTION (3/3)

**FUNDING AGENCY: JAPANESE MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY (MEXT)**

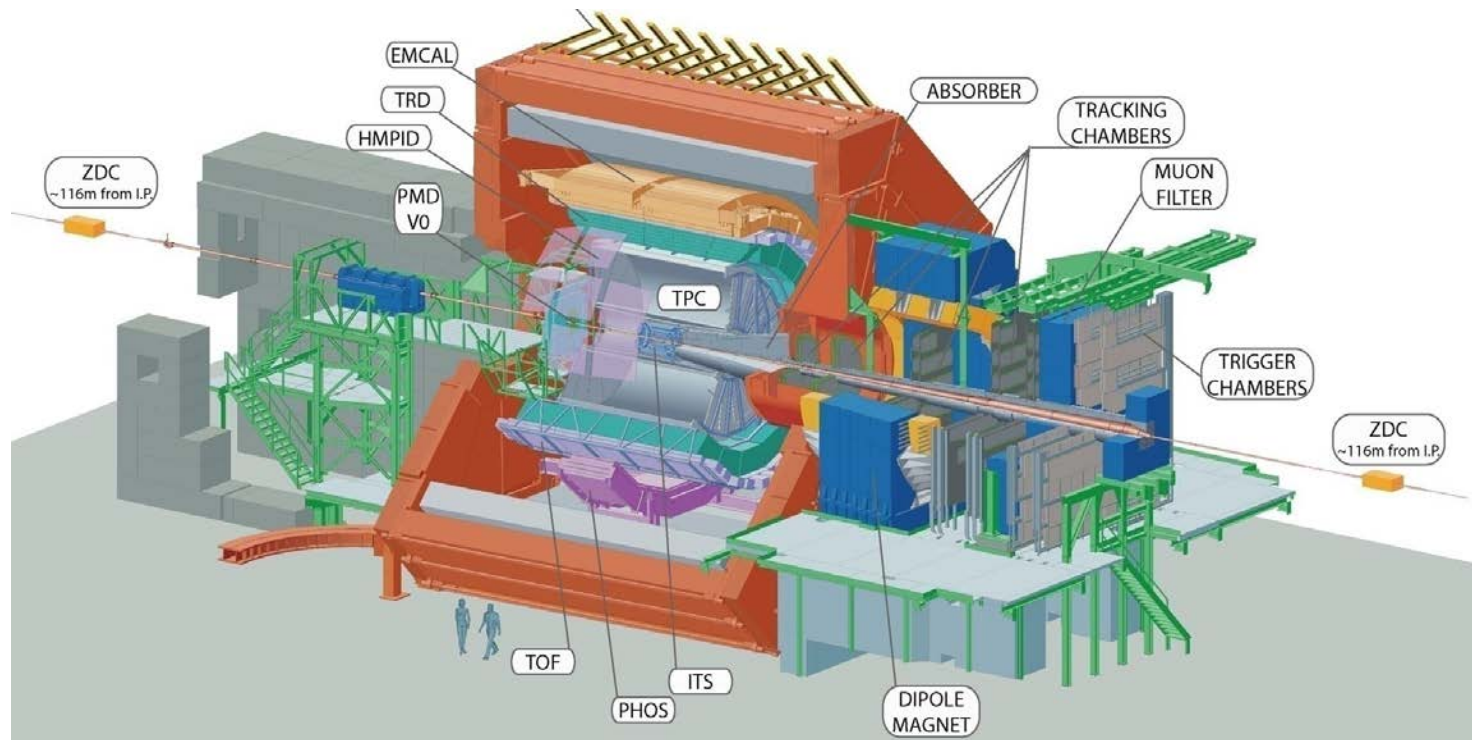
Contribution to the Common Fund for Upgrade (ALICE-RRB-2013-125) :  
78.6 kCHF for 9 Scientists

The Addendum No. 35 to the Memorandum of Understanding for Collaboration in the Construction of the ALICE Detector: Common Infrastructure for the Upgrade of the ALICE detector has been signed on January 6<sup>th</sup> 2014 by the University of Hiroshima and the University of Tokyo.

- (Do you have a MoU for Univ. of Tsukuba?)



# JAPAN AND ALICE



## Sub detectors:

- Photon Spectrometer (PHOS)
- Transition Radiation Detector (TRD)
- Electromagnetic and Di-Jet Calorimeter (EMCal/ DCal)
- Time Projection Chamber (TPC)
- GEM Time Projection Chamber (GEM-TPC, upgrade)
- Muon Forward Tracker (MFT, upgrade)
- Forward Calorimeter (FoCal, upgrade under consideration)



# ALICE ACTIVITIES AT FULL MEMBERS INSTITUTES

## Hiroshima University

- Photon Spectrometer detector (PHOS)
- Photon and neutral meson measurements
- Thermal dynamics and quark behavior
- ALICE Tirc-2 Center in Japan
- Muon Forward Tracker (MFT) – upgrade

## University of Tokyo, CNS

- Time Projection Chamber (TPC, RCU2, operation)
- GEM-Time Projection Chamber (GEM-TPC) – upgrade
- Electro-Magnetic probe, Heavy Flavors, Soft Physics
  - Low mass di-electron Physics Analysis Coordinator: Taku Gunji

## University of Tsukuba

- Electromagnetic Calorimeter (EMCAL) and Di-jet Calorimeter (DCAL)
- Jet and soft physics, forward physics
  - Jet Physics Working Group Convenor: Oliver Busch
- Forward Calorimeter (FOCAL) – upgrade under consideration
- ALICE Tirc-2 Center in Japan (under preparation)

## Nagasaki Institute of Applied Sciences

- TPC Common Readout Unit (CRU) R&D



# GRANTS IN JAPAN ON ALICE

(Listed only grants dedicated to ALICE)

Grant-in-Aid for Scientific Research	Years (JFY)	k yen	Principal
Scientific Research (B)	2015 – 2018	16,640	Kenta Shigaki
Scientific Research (S)	2014 – 2018	141,200	Toru Sugitate
Scientific Research (B)	2013 – 2016	15,200	Yasuo Miake
Scientific Research (B)	2013 – 2015	19,980	Tatsuya Chujo
Scientific Research (A)	2011 – 2013	47,970	Toru Sugitate
Scientific Research (B)	2011 – 2014	19,370	Kenta Shigaki
Scientific Research (A)	2010 – 2012	47,580	Hideki Hamagaki
Scientific Research (S)	2008 – 2012	85,020	Yasuo Miake
Young Scientists (B)	2008 – 2009	4,420	Taku Gunji
Research Activity Start-up	2007	1,350	Taku Gunji
Specially Promoted Research	2006 – 2010	403,910	Toru Sugitate
JSPS Fellows	2006 – 2008	3,400	Hisa Torii
Scientific Research (B)	2003 – 2005	16,300	Toru Sugitate



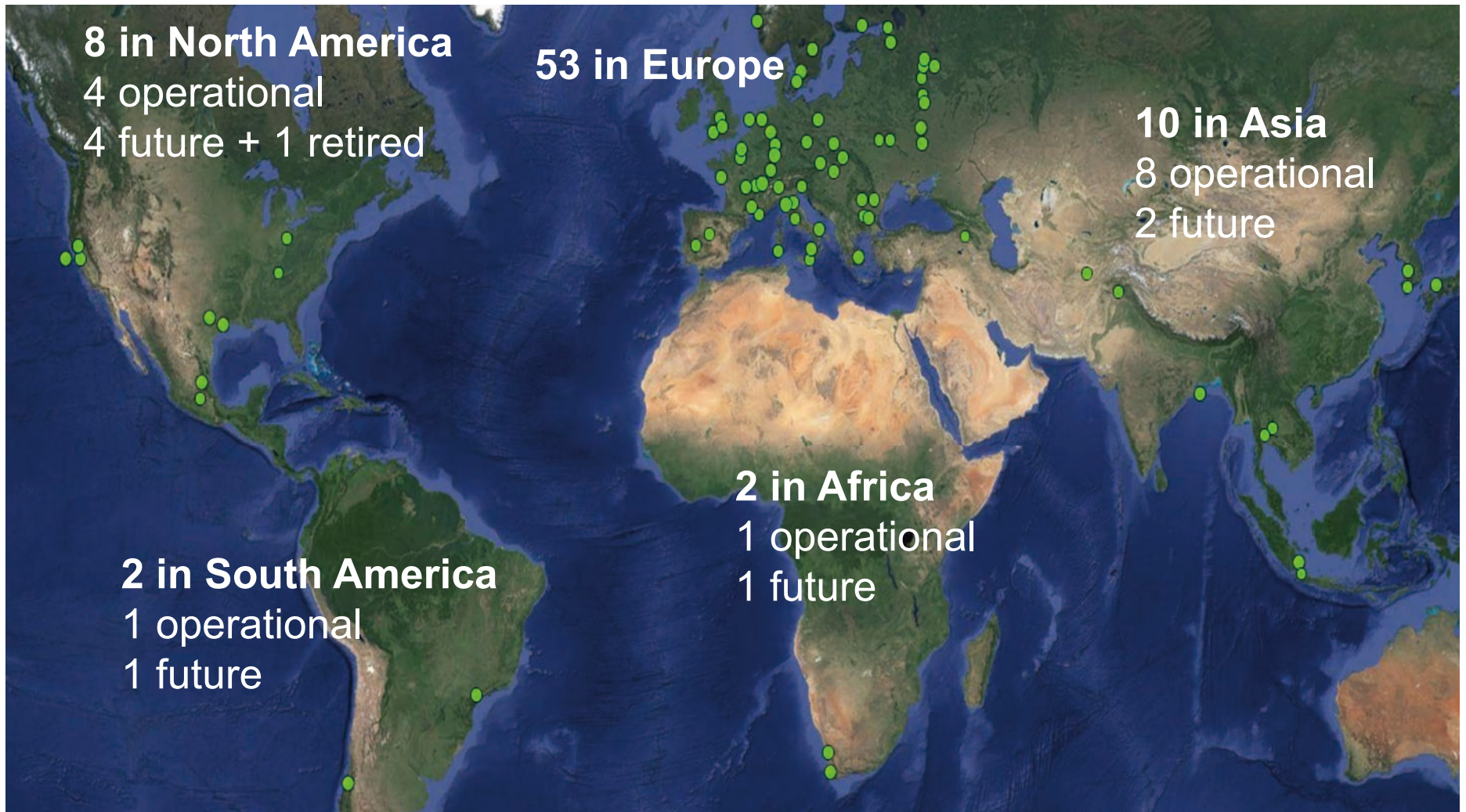
# GRANTS IN JAPAN ON ALICE

(Listed only grants dedicated to ALICE)

Other Grants	Years (JFY)	k yen	Principal
Bilateral Research (JSPS-BFBR, Russia)	2015 – 2016	2,250 per Year	Toru Sugitate
Bilateral Research (JSPS-CNRS, France)	2013 – 2016	2,250 per Year	Tatsuya Chujo
French Japan Particle Physics Laboratory (FJPPL, TYL)	2010 – present	300 per Year	Yasuo Miake (2010-2013) Tatsuya Chujo (2014-2015)
Strategic Young Researcher Overseas Visits Program for Accelerating Brain Circulation	2010 – 2015	70,000 (2010-2012, total) 80,000 (2013-2015, total)	Hideki Hamagaki (2010 – 2012) Kenta Shigaki (2013 – 2015)
Graduate School Program for History of Universe	2007 – 2016	~ 15,000 per Year (2007-2013) 10,000 (2014-2016, total)	Yasuo Miake



# ALICE GRID



# ALICE TIER-2 CENTER IN JAPAN

## Hiroshima T2 site

- The ALICE T2 site “**JP-HIROSHIMA-WLCG**” with grid middleware EMI-3 on SL6.5... **as stable as possible.**
- GRID service; APEL, sBDII, CREAM-CE, XROOTD, DPM-SE, VOBX... **as compact as possible.**
- WN resources; **1356 Xeon-cores in total**  
**Xeon5355(4c@2.6GHz) x 2cpu x 16 boxes**  
Xeon5365(4c@3.0GHz) x 2cpu x 20 blades  
Xeon5570(4c@2.9GHz) x 2cpu x 26 blades  
Xeon5670(6c@2.9GHz) x 2cpu x 3 blades  
Xeon5660(6c@2.8GHz) x 2cpu x 42 blades  
E5-2470v2(10c@2.4GHz) x 2cpu x 16 blades
- Storage; **1,056TB disks** on 9 servers, but **no MS**
- Around **3/4 resource** deployed to ALICE GRID, and the rest for a local cluster
- Network B/W: **1Gbps** on 40Gbps-SINET4 in Japan
- WLCG support by ASGC in Taiwan
- Responsible by Prof. Toru Sugitate
- Operated by TS and K.Tarunaga (M2) under remote technical support by **SOUM corp.**, Tokyo.



## Tsukuba T2 site

(under preparation)

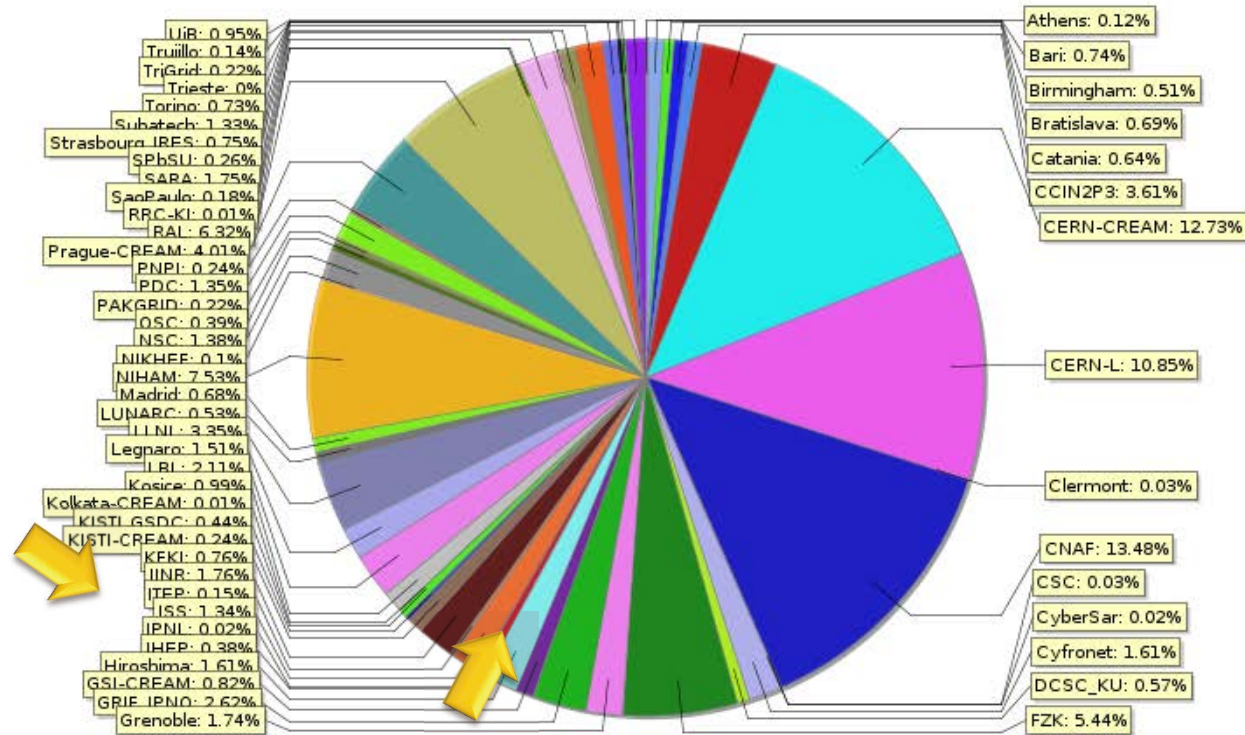




# CONTRIBUTION TO ALICE PRODUCTION

What is this about?

Total CPU time for ALICE jobs [hours]



Athens Bari Birmingham Bratislava Catania CCIN2P3 CERN-CREAM CERN-L Clermont CNAF CSC CyberSar Cyfronet DCSC\_KU FZK  
 Grenoble GRIF\_IPNO GSI-CREAM Hiroshima IHEP IPNL ISS ITEP JINR KFKI KISTI-CREAM KISTI\_GSDC Kolkata-CREAM Kosice LBL  
 Legnaro LLNL LUNARC Madrid NIHAM NIKHEF NSC OSC PAKGRID PDC PNPI Prague-CREAM RAL RRC-KI SaoPaulo SARA SPbSU  
 Strasbourg\_IRES Subatech Torino Trieste TriGrid Trujillo UjB



# ALICE JAPAN IN PUBLIC



**ALICE-J web page** <http://alice-j.org>

maintained by Tatsuya Chujo, ALICE outreach contact in Japan.

# THE LS2 ALICE UPGRADES

## New Inner Tracking System (ITS)

- improved pointing precision
- less material -> thinnest tracker at the LHC

## Muon Forward Tracker (MFT)

- new Si tracker
- Improved MUON pointing precision

## Time Projection Chamber (TPC)

- new GEM technology for readout chambers
- continuous readout
- faster readout electronics

## MUON ARM

- continuous readout electronics

## New Central Trigger Processor

## Data Acquisition (DAQ)/ High Level Trigger (HLT)

- new architecture
- on line tracking & data compression
- 50kHz PbP event rate

## TOF, TRD, ZDC

- Faster readout

## New Trigger Detectors (FIT)

