



ICRR External Review 2019
May 15-17, 2019

Introduction of the Institute for Cosmic Ray Research (ICRR)

May 15, 2019

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Outline

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Purpose of this External Review meeting

- In order to improve the activities of ICRR, the activities should be checked and evaluated by the external experts from the related fields.
- We would like to ask the Review Committee to evaluate;
 - the scientific activities of ICRR, such as the achievements, present activity and the future directions
 - various activities of ICRR, such as the inter-University research programs, relation with the outside groups/organization (Japanese cosmic ray community (CRC), KEK, NAOJ, Kavli-IPMU, Physics department, ...), and graduate education.
 - whatever the advise to ICRR.

Information related to the Purpose of this External Review meeting

- External Review meetings of ICRR have been held in approximately every 6 years. The previous one was held in 2013, and the review report was written in the same year.
- In 2004, the Japanese National Universities became independent administrative agencies (National University Corporation). Each University is reviewed in every 6 years. ICRR is also reviewed within this scheme as a research institute of The University of Tokyo.
- In 2010, ICRR became “Joint Usage / Research Center”. Then in 2018, ICRR was selected as one of “International Joint Usage / Research Center”. These “Centers” will be reviewed in every 6 years (and a mid term review), almost synchronized with the University review.
- Therefore, ICRR may refer the review report from this external review in the “National University Corporation” and “International Joint Usage / Research Center” reviews.

History of ICRR (before 2013)

Year	
1953	Established as the Cosmic Ray Observatory of the Univ. of Tokyo (@Mt. Norikura)
1976	Reorganized as the Institute for Cosmic Ray Research (ICRR) of the Univ. of Tokyo (@Tanashi, Tokyo)
1977	Akeno Observatory of ICRR was established
1983	Kamiokande experiment started
1990	AGASA (100 km ² array) constructed
1992	Cangaroo (TeV gamma ray experiment @ Woomera, Australia) started
1993	Construction of the Tibet AS γ experiment started
1995	Kamioka Observatory was established
1996	Super-Kamiokande experiment started
2000	ICRR moved to Kashiwa
2001	Accident in Super-Kamiokande
2003	International Cosmic Ray Conference



History of ICRR (before 2013, cont'd)

Year

2003 Construction of Telescope Array (TA) for the highest energy cosmic rays started

Construction of Canagroo-III completed

2008 The Telescope Array (TA) experiment started the observation

2009 High energy astrophysics group (theory) was formed

2010 The T2K (Tokai-to-Kamioka, co-hosted by ICRR and KEK) long baseline experiment started data taking

ICRR was selected as one of “Joint Usage / Research Center”

The construction of KAGRA gravitational wave telescope was approved

The XMASS dark matter experiment started data taking

2011 Earthquake (March 11)

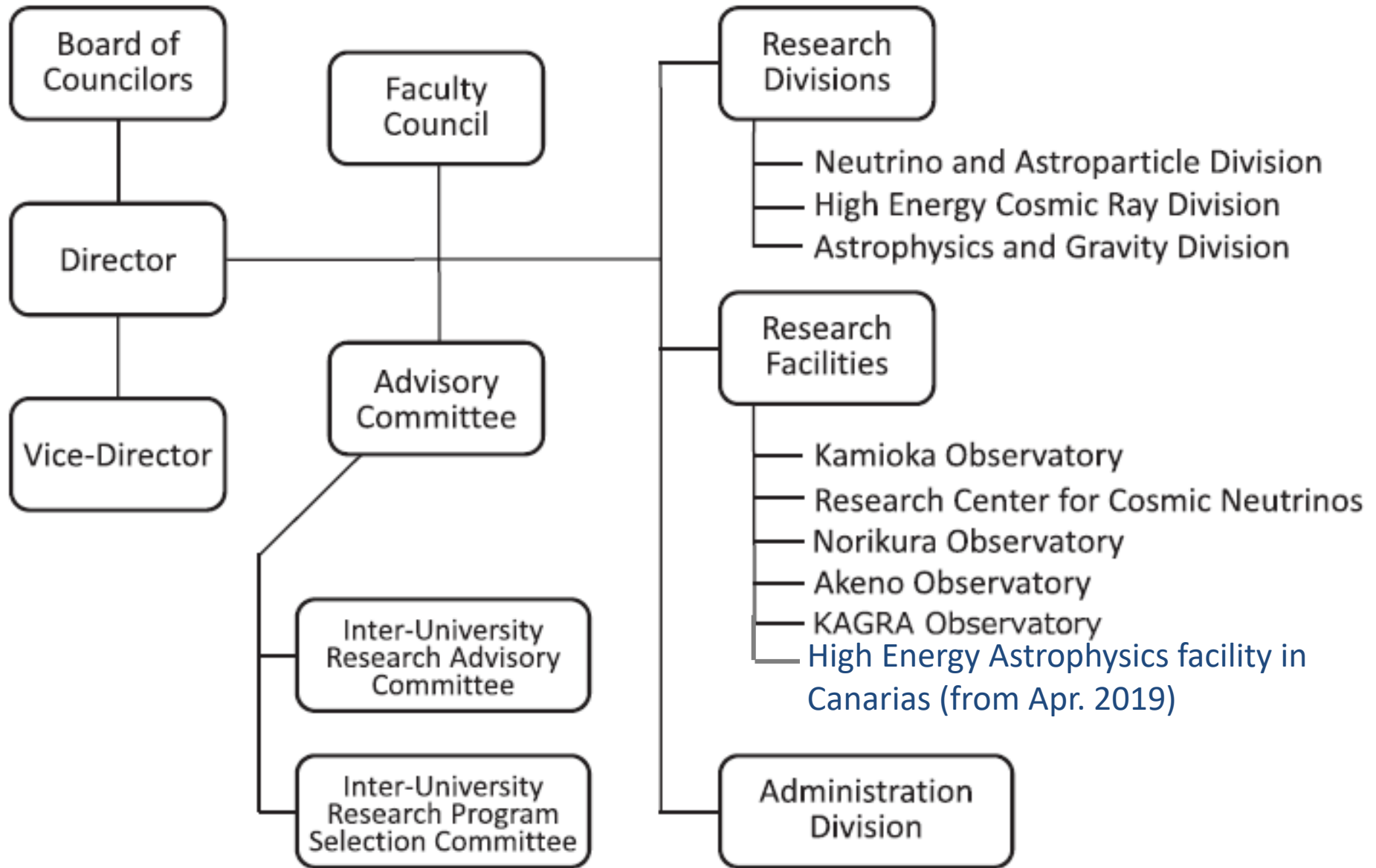
2011-2012 The CANGAROO-III experiment and the emulsion development system finished the operation

2012 The committee for the planning of the future ICRR research projects (IV) was formed.

ICRR after 2013

Year	
2013	Report from the committee for the planning of the future ICRR research projects (IV) (CTA was strongly recommended)
2015	The construction of the first CTA Large Sized Telescope (LST) was commenced
2016	KAGRA observatory was established
	The committee for the planning of the future ICRR research projects (V) was formed
2017	Report from the committee for the planning of the future ICRR research projects (V) (Hyper-Kamiokande was strongly recommended)
2018	Super-Kamiokande tank-open for SK-Gd
	1 st CTA-LST construction completed.
	ICRR was selected as one of “International Joint Usage / Research Center”
2019	TAX4 detector deployment began
	KAGRA finished the construction
	High Energy Astrophysics facility in Canarias was established

Structure of ICRR



ICRR staffs (2018)

Scientific and Technical staffs

Profs	Associate profs	Research associates	Technical Staffs	Project profs ¹	Project Assoc. Profs. ¹	Project research associates ¹	Post-doc fellows	Total
9	15	18	8 +5	1	1	13	9 +4 ²	79

- 1) Project (Associate) professors and Project research associates have fixed terms.
- 2) 4 JSPS Post-doc fellows studying in ICRR.

Comparison between 2018 and 2012 (numbers of “2018 – 2012” are shown)

Profs	Associate profs	Research associates	Technical Staffs	Project profs	Project Assoc. Profs.	Project research associates	Post-doc fellows	Total
0	+2	+3	0 /?	+1	0	0	-5 /+1	+2

3 Research Divisions

Division	Projects and groups	Personnel (faculty members only), (*):head as of 2018
Neutrino and Astroparticle Division	Super-Kamiokande T2K XMASS (finished obs in Dec. 2018) Hyper-Kamiokande R&D	M.Shiozawa(*), M.Nakahata, Y.Hayato, T.Kajita, Y.Kishimoto (moved to Tohoku U), K.Okumura, S.Moriyama, H.Sekiya, S.Nakayama
High Energy Cosmic Ray Division	TA (Telescope Array) Tibet AS γ High Energy Astrophysics CTA Ashra R&D	H.Sagawa(*), M.Teshima, R.Enomoto, M.Sasaki, M.Takita, T.Yoshikoshi, T.Sako, K.Asano, K.Noda
Astrophysics and Gravity Division	KAGRA Observational Cosmology Theory (elementary particles and cosmology)	M.Ohashi(*), M.Kawasaki, M.Ibe, S.Miyoki, T.Uchiyama, H.Tagoshi, M.Ouchi

Research Facilities

Facilities	Duties	Personnel (faculty members only), (*):head as of 2018
Kamioka Observatory	Super-Kamiokande and other inter-university research programs at Kamioka	M.Nakahata(*), Y.Hayato, Y.Kishimoto, S.Moriyama, M.Shiozawa, H.Sekiya, S.Nakayama
Norikura Observatory	Inter-university research programs at Norikura	M.Takita(*)
Akeno Observatory	Inter-university research programs at Akeno	H.Sagawa(*)
Research Center for Cosmic Neutrinos	Computer Facility and Kashiwa low-background facility (and their inter-university research programs)	K.Okumura(*), T.Kajita
KAGRA Observatory	KAGRA	M.Ohashi (*), S.Miyoki, T.Uchiyama, H.Tagoshi
High Energy Astrophysics facility in Canarias (from Apr. 2019)	CTA	M.Teshima(*),T.Yoshikoshi, K.Noda

Overseas Experimental Sites

Experiment	Location	Remarks
TA	Utah, USA	Highest energy cosmic ray
Tibet AS γ	Yangbajing, Tibet, China	Cosmic Ray around the knee, Gamma ray around 100TeV
Chacaltaya / ALPACA R&D	(near) Chacaltaya mountain, Bolivia	Cosmic Ray around the knee, Gamma ray around 100TeV (R&D)

Decision making process in ICRR for large projects

- In ICRR, we ask the ICRR Advisory committee to form the “committee for the planning of the future ICRR research projects”. Essentially all the members of this committee is outside of ICRR.
- This committee gives us the recommendation typically with the priority of the projects.

Year of the committee report	1 st priority recommendation	The year that the project was approved by the government
1987	Super-Kamiokande	1991
1993	KAGRA Telescope Array	--- 2003 by Grants-in-Aid for Scientific Research
2007	KAGRA	2010
2013	CTA	2016
2017	Hyper-Kamiokande	(Seed funding, 2019)

Inter-University Research Programs

Activities as “Joint Usage / Research Center” (previous Inter-university Research Institute)

- Proposal deadline: Early January
- Selection by the Inter-University Research Program Selection Committee: Feb to March
- **Period of the research: April to March next year**
- Research report: soon after the end of FY

Facilities	2012	2013	2014	2015	2016	2017	Subtotal
Kamioka Observatory	33	33	38	39	39	42	224
Akeno Observatory	4	4	5	7	4	4	28
Norikura Observatory	7	9	10	11	12	10	59
Low-Level Radioisotope Measurement Facility	6	5	4	3	4	4	26
KAGRA Observatory ¹	15	21	22	19	17	14	108
Laboratorial Facility in Kashiwa	10	9	5	9	3	3	39
Computer Facility in Kashiwa	12	17	14	12	12	12	79
Conference Facility in Kashiwa	7	7	10	10	11	13	58
Overseas Facilities ²	11	12	11	13	23	26	96
Annual Sums	105	117	119	123	125	128	717

- From FY2019, Proposals from the International communities/collaborators are accepted. (In FY 2019, 24 such proposals have been accepted, in addition to 133 proposals from the Japanese community.)

Educational activities (as the members of the Physics (and Astronomy) departments

	2011	2012	2013	2014	2015	2016	2017	2018
Master students	14	18	28	31	30	35	34	34
Master theses	5	9	9	18	12	16	13	
Doctor students	15	14	16	15	22	25	33	37
Doctor theses	2	5	3	3	8	4	3	



Some educational activities

- 1) The first Spring School on Universe and Elementary Particles (for the 3rd year undergraduate students) started in March 2012. Therefore, students who could attend the Spring School (and inspired by the school) came to ICRR from FY 2014.
- 2) A meeting that was organized by ICRR students for the presentation of the student research activities was held in Feb. 2012 involving all the ICRR students. The Director Prize was presented to one student.
- 3) In order to have better communication among the ICRR students, common rooms for the first year master course students have been arranged since April 2012. (A single big room for them has been prepared in April 2019.)