

Subaru Telescope International Partnership Workshop – Summary Report

Date: 03 / 25 / 2019

To: The Director of the Subaru Telescope

Workshop chair person	Name	Yen-Ting Lin		
	Affiliation Job Title	Associate Research Fellow, Institute of Astronomy & Astrophysics, Academia Sinica		
	Tel	+886-2-2366-5443	E-mail	ytl@asiaa.sinica.edu.tw
Workshop title	Panchromatic Panoramic Studies of Galaxy Clusters: from HSC to PFS & ULTIMATE			
Date	03 / 11 / 2019 – 03 / 13 / 2019			
Venue (address)	ASIAA, Astro-Math building, No.1, Sec.4, Roosevelt Road, Taipei, Taiwan			
Number of participants	83			
Workshop overview	(Please briefly describe scientific rationales, and what you learned/achieved through the WS.) The primary goals of the workshop are (1) to showcase the results from the HSC galaxy cluster working group, (2) to promote collaboration with scientists outside of the HSC team, and (3) to enhance interests from the global community on Subaru. It also serves as a venue for people from other cluster surveys to present their latest results. We believe all these goals have been successfully achieved. The workshop has attracted participants from both within and outside of the Subaru community. The principle investigator of the HSC survey (Dr. Satoshi Miyazaki), as well as chairs of several science working groups (cluster, low-z galaxy, photo-z), and representatives of the PFS and ULTIMATE projects, all attended the workshop. The facts that only 20 out of the 43 talks were on HSC/PFS/ULTIMATE, and that 2/3 of the participants came from outside of Taiwan, show that this is truly an international workshop. We realize that HSC is a very small collaboration (compared to e.g., Dark Energy Survey). To enhance the scientific output from the survey, we thus need to work with external collaborators who can bring in additional resources (e.g., observing facilities, theoretical/modeling expertise). We believe that with this workshop, we have successfully branched out and recruited many potential collaborators who will make the HSC survey even more successful.			
Discussion on Subaru international operation during the workshop	(Please describe what you discussed toward the era of Subaru international operation) The program of the workshop was designed to first show off the unique capabilities of HSC in delivering cluster samples selected in various ways (which is very difficult with other surveys), then offers ways for potential international partners to collaborate. To this end, we have had two discussion sessions (on “concerted follow up efforts of HSC cluster samples” and “cluster studies with Subaru in the TMT/GMT/LSST/WFIRST era”), during which many non-Subaru scientists (particularly from Korea, Australia, Italy, Germany) had actively engaged in the discussion. Korean scientists were especially enthusiastic about the potential of collaboration, as testified by comments from Prof. Changbom Park (KIAS; one of the SOC members of the workshop). In his concluding remarks, he said that this was the first meeting in Taiwan he participated with more than 2 Koreans. (In fact, there were 10 scientists from Korea in the workshop.) He also said that he for sure is now quite interested in Subaru. We believe this workshop has planted a seed for a future Subaru-Korea collaboration.			
Comments on the Subaru WS support program (if any)	The support for participants from the outside of Japan is limited to the only airfare. Because this is a WS for "international" partnership, it is much better if the support is more flexible for international participants.			

Note 1: You can adjust the size of the boxes as you want, but the report must be within 1-page.

Monday March 11, 2019	
08:30~08:50	Registration
08:50~09:00	Announcement LOC
I: HSC & Sister Cluster Surveys Chair: Yen-Ting Lin (ASIAA)	
09:00~09:30	Invited Shear selected clusters catalogs based on HSC-SSP Satoshi Miyazaki (<i>National Astronomical Observatory of Japan</i>)
09:30~09:50	Invited HSC data release Sogo Mineo (<i>NAOJ</i>)
09:50~10:10	Invited An optically selected HSC cluster catalog Masamune Oguri (<i>University of Tokyo</i>)
10:10~10:30	Invited Galaxy quenching explored with HSC ² , PFS ² , and ULTIMATE-K Tadayuki Kodama (<i>Tohoku University</i>)
10:30~10:50	Coffee Break
10:50~11:10	Invited A systematic search for protoclusters based on Subaru/HSC survey Jun Toshikawa (<i>University of Tokyo</i>)
11:10~11:25	Hyper Suprime-Cam Weak Lensing Measurement of Galaxy Clusters selected by Atacama Cosmology Telescope Hironao Miyatake (<i>Nagoya University</i>)
11:25~11:40	HectoMAP Galaxy Cluster Surveys Jubee Sohn (<i>Havard-Smithsonian Center for Astrophysics</i>)
11:40~11:55	Probing large-scale structures with emission-line galaxies selected from HSC narrow-band data Masao Hayashi (<i>National Astronomical Observatory of</i>

	<i>Japan</i>)
11:55~12:15	Short Discussion I
12:15~13:30	Lunch
II: Cluster Galaxy Population Chair: Masao Hayashi (NAOJ)	
13:30~13:50	Invited Stripping, quenching and morphological transformations of cluster galaxies according to the IllustrisTNG simulations Annalisa Pillepich (<i>MPIA Heidelberg</i>)
13:50~14:10	Invited How fast is the evolution of galaxies in clusters? Benedetta Vulcani (<i>INAF - OaPD</i>)
14:10~14:25	Star formation in cluster galaxies since $z \sim 1$ Howard Yee (<i>University of Toronto</i>)
14:25~14:40	Exploring cluster galaxy evolution with the HSC survey Yen-Ting Lin (<i>AS/AA</i>)
14:40~14:55	The brightest UV-selected galaxies in protoclusters at $z \sim 4$: Ancestors of Brightest Cluster Galaxies? Kei Ito (<i>SOKENDAI/NAOJ</i>)
14:55~15:25	Coffee Break
15:25~15:45	Invited Galaxy populations in the most distant SPT-SZ clusters: the evolution of galaxies in the first massive cluster environments Veronica Strazzullo (<i>Ludwig-Maximilians-Universität München</i>)
15:45~16:00	Why are the galaxies in clusters gas poor? Lessons from simulations Sukyoung Yi (<i>Yonsei University</i>)
16:00~16:15	Unveiling Quenching History of Cluster Galaxies Using Phase-space Analysis Jinsu Rhee (<i>Yonsei Univ.</i>)

16:15~16:30	The kinematic morphology - density relationship in clusters Sarah Brough (<i>University of New South Wales</i>)
16:30~16:45	Modelling galaxy quenching and spatial distributions of star-forming and quenched galaxies Taira Oogi (<i>Kavli IPMU</i>)
16:45~17:10	Short Discussion II

Tuesday March 12, 2019

III: Cluster Cosmology and Cluster Astrophysics

Chair: Masamune Oguri (The University of Tokyo)

09:00~09:20	Invited Cosmological Insights from SZE and X-ray Selected Cluster Samples: SPT, RASS and Prospects for eROSITA Joe Mohr (<i>LMU-Munich</i>)
09:20~09:35	Analysis of systematic bias on lensing analysis using optical clusters Tomomi Sunayama (<i>Kavli IPMU</i>)
09:35~09:50	Constraining the Richness-to-Mass Relation of CAMIRA Clusters using the Lensing Effect of Magnification Bias in the Hyper Suprime-Cam Survey I-Non Chiu (<i>ASIAA</i>)
09:50~10:05	Mapping the Galaxy Distribution in and around Galaxy Clusters Ho Seong Hwang (<i>Korea Astronomy and Space Science Institute</i>)
10:05~10:20	HSC Weak-lensing Analysis of XXL-selected Galaxy Clusters Keiichi Umetsu (<i>ASIAA</i>)
10:20~10:50	Coffee Break
10:50~11:10	Invited Cluster Cosmology in the DES Eduardo Rozo (<i>University of Arizona</i>)
11:10~11:25	Cosmology and Cluster Astrophysics with WL and tSZ Ken Osato (<i>The University of Tokyo</i>)

11:25~11:40	Cluster Observables and Mass Calibration: An Exercise in Robustness Youngsoo Park (<i>Kavli IPMU</i>)
11:40~11:55	Measurement of redshift dependent cross-correlation of HSC clusters and Fermi gamma-rays Atsushi Nishizawa (<i>Nagoya University</i>)
11:55~12:15	Short Discussion III
12:15~12:20	Group Photo
12:20~13:30	Lunch
IV: Challenges & New Ideas in Cluster Studies Chair: Keiichi Umetsu (ASIAA)	
13:30~13:45	Arizona Cluster Redshift Survey (ACReS) Eiichi Egami (<i>University of Arizona</i>)
13:45~14:00	Galaxy Clusters in the Magneticum Simulations Klaus Dolag (<i>Ludwig-Maximilians University Munich</i>)
14:00~14:15	Matching the XXL and HSC-CAMIRA cluster samples: Lessons in selection bias and cluster astrophysics Jon Willis (<i>University of Victoria</i>)
14:15~14:30	Exploring the fossil record of galaxy evolution in clusters: the intracluster light. Mireia Montes (<i>UNSW Sydney</i>)
14:30~14:45	Cosmology with Fingers-of-God Changbom Park (<i>Korea Institute for Advanced Study</i>)
14:45~15:00	High Redshift Protoclusters as Drivers of Cosmic Star Formation and the Cosmic Hot Gas Content Yi-Kuan Chiang (<i>Johns Hopkins University</i>)
15:00~15:30	Coffee Break
15:30~17:00	Discussion I: Cluster Mass Calibration & Concerted Follow Up Chairs: Subha Majumdar (TIFR) and Yusei Koyama (Subaru Telescope)

18:30	Banquet
Wednesday March 13, 2019	
V: Multi-wavelength Studies of Clusters Chair: Changbom Park (KIAS)	
09:00~09:20	Invited Halo Concentration, Galaxy Red Fraction, and Gas Properties of Optically-defined Merging Clusters Nobuhiro Okabe (<i>Hiroshima Univ.</i>)
09:20~09:40	Invited SZ Observations of HSC Clusters with MUSTANG2 Tony Mroczkowski (<i>ESO</i>)
09:40~09:55	X-ray observations of optically-selected galaxy clusters in the Subaru HSC-SSP field Naomi Ota (<i>Nara Women's University</i>)
09:55~10:10	Multi-wavelength Observations of Candidate Starbursting Protoclusters selected by Planck and Herschel Tai-An Cheng (<i>Imperial College London</i>)
10:10~10:30	Short Discussion IV
10:30~10:50	Coffee Break
VI: Future of Subaru: PFS+ULTIMATE Chair: Teppei Okumura (ASIAA)	
10:50~11:10	Invited The current status of PFS project Kiyoto Yabe (<i>Kavli IPMU</i>)
11:10~11:30	Invited ULTIMATE-Subaru: toward the "bright" future of Subaru Telescope Yusei Koyama (<i>Subaru Telescope</i>)
11:30~11:45	Spectroscopic Identifications of Early Large Scale Structures with Protoclusters Over 200 Mpc Yuichi Harikane (<i>The University of Tokyo</i>)
11:45~12:00	Connection between star formation activities in galaxy clusters and surrounding environment Myungshin Im (<i>Seoul National University</i>)

12:00~12:15	Studying High-Redshift Protoclusters with IGM Tomography Khee-Gan Lee (<i>Kavli IPMU</i>)
12:15~12:30	The environmental impacts on the mass-metallicity relation at $z=1.52$. Shigeru Namiki (<i>SOKENDAI, NAOJ</i>)
12:30~13:30	Lunch
13:30~14:30	Discussion II: Cluster Studies with Subaru in the TMT/GMT era Chair: Taddy Kodama (Tohoku)
14:30~14:40	Concluding remarks Changbom Park (<i>Korea Institute for Advanced Study</i>)

Participants

Total number: 82		
1	Aniket Agrawal	ASIAA
2	Makoto Ando 安藤誠	University of Tokyo
	[Poster] Exploring the galaxy proto-cluster core at z~2	
3	Sarah Brough	University of New South Wales
	[Oral Presentation] The kinematic morphology - density relationship in clusters	
4	Chihway Chang 張芷維	University of Chicago
5	Kai-Feng Chen 陳凱風	NTU/ASIAA
	[Poster] Cosmology Constraints from Shear Selected Clusters in the Subaru Hyper Suprime- Cam Survey	
6	Ken Chen 陳科榮	ASIAA
	[Poster] How the First Supernovae Influenced the IGM at the early Universe	
7	Tai-An Cheng	Imperial College London
	[Oral Presentation] Multi-wavelength Observations of Candidate Starbursting Protoclusters selected by Planck and Herschel	
8	Yi-Kuan Chiang 江奕寬	Johns Hopkins University
	[Oral Presentation] High Redshift Protoclusters as Drivers of Cosmic Star Formation and the Cosmic Hot Gas Content	
9	I-Non Chiu 邱奕儂	ASIAA
	[Oral Presentation] Constraining the Richness-to-Mass Relation of CAMIRA Clusters using the Lensing Effect of Magnification Bias in the Hyper Suprime-Cam Survey	
10	Luis Diaz-garcia	ASIAA
11	Klaus Dolag	Ludwig-Maximilians University Munich
	[Oral Presentation] Galaxy Clusters in the Magneticum Simulations	
12	Eiichi Egami 江上英一	University of Arizona
	[Oral Presentation] Arizona Cluster Redshift Survey (ACReS)	
13	Tomo Goto	National Tsing Hua University
14	Hong Guo	Shanghai Astronomical Observatory
15	Takashi Hamana	National Astronomical Observatory Japan
16	Yuichi Harikane	The University of Tokyo
	[Oral Presentation] Spectroscopic Identifications of Early Large Scale Structures with Protoclusters Over 200 Mpc	

17	Tetsuya Hashimoto 橋本哲也	NTHU
18	Masao Hayashi	National Astronomical Observatory of Japan
	[Oral Presentation] Probing large-scale structures with emission-line galaxies selected from HSC narrow-band data	
19	Chien Chang Ho 何建璋	NTHU
20	Kuan-Chou Hou 侯冠州	Ben-Gurion University of the Negev
	[Poster] Virial shocks in galaxy clusters	
21	Bau-Ching Hsieh 謝寶慶	ASIAA
22	Yun-Hsin Hsu 徐允心	NTHU/ASIAA
23	Locutus Huang	ASIAA
24	Ho Seong Hwang 黃湖盛	Korea Astronomy and Space Science Institute
	[Oral Presentation] Mapping the Galaxy Distribution in and around Galaxy Clusters	
25	Minhee Hyun 玄旻喜	Seoul National University
	[Poster] A study of galaxy overdensities at z~1 in ELAIS-N1 field, one of HSC deep fields	
26	Myungshin Im	Seoul National University
	[Oral Presentation] Connection between star formation activities in galaxy clusters and surrounding environment	
27	Kei Ito 伊藤 慧	SOKENDAI/NAOJ
	[Oral Presentation] The brightest UV-selected galaxies in protoclusters at z~4: Ancestors of Brightest Cluster Galaxies?	
28	Hung-Yu Jian	ASIAA
	[Poster] Subaru Hyper Suprime-Cam survey: Redshift Evolution of Green Valley Galaxies in Different Environments	
29	Nobunari Kashikawa	University of Tokyo
30	Lalitwadee Kawinwanichakij 陳诗燕	Kavli Institute for the Physics and Mathematics of the Universe
31	Seong-Jin Kim	NTHU
32	Jongwan Ko	Korea Astronomy and Space Science Institute (KASI)
	[Poster] Evidence for the existence of abundant intracluster light ~5 billion years after the Big Bang	
33	Tadayuki Kodama	Tohoku University
	[Oral Presentation] Galaxy quenching explored with HSC^2, PFS^2, and ULTIMATE-K	
34	Yusei Koyama 小山佑世	Subaru Telescope
	[Oral Presentation] ULTIMATE-Subaru: toward the "bright" future of Subaru Telescope	
35	Khee-Gan Lee 李啓根	Kavli IPMU
	[Oral Presentation] Studying High-Redshift Protoclusters with IGM Tomography	
36	Yongming Liang 梁永明	NAOJ/Sokendai
	[Poster] Search for massive LAE overdensities traced by IGM to study their correlation at z~2.2	
37	Kai-yang Lin 林凱揚	ASIAA
38	Lihwai Lin	ASIAA

39	Sheng-Chieh Lin 林聖傑	ASIAA
40	Yen-Ting Lin 林彥廷	ASIAA
	[Oral Presentation] Exploring cluster galaxy evolution with the HSC survey	
41	Chih-Teng Ling 凌志騰	NTHU
	[Poster] What determines the maximum stellar surface density of galaxies in different environments?	
42	Wentao Luo 羅文濤	Kavli IPMU
	[Poster] A study of AGN-halo connection from galaxy-galaxy lensing signals based on HSC data.	
43	Subhabrata Majumdar	Tata Institute of Fundamental Research
44	Sogo Mineo 峯尾聡吾	NAOJ
	[Oral Presentation] HSC data release	
45	Hironao Miyatake 宮武広直	Nagoya University
	[Oral Presentation] Hyper Suprime-Cam Weak Lensing Measurement of Galaxy Clusters selected by Atacama Cosmology Telescope	
46	Satoshi Miyazaki 宮崎 聡	National Astronomical Observatory of Japan
	[Oral Presentation] Shear selected clusters catalogs based on HSC-SSP	
47	Joe Mohr	LMU-Munich
	[Oral Presentation] Cosmological Insights from SZE and X-ray Selected Cluster Samples: SPT, RASS and Prospects for eROSITA	
48	Mireia Montes	UNSW Sydney
	[Oral Presentation] Exploring the fossil record of galaxy evolution in clusters: the intracluster light.	
49	Tony Mroczkowski	ESO
	[Oral Presentation] SZ Observations of HSC Clusters with MUSTANG2	
50	Ryoma Murata	Kavli IPMU/The University of Tokyo
	[Poster] Constraining mass-richness relation of HSC CAMIRA clusters with weak gravitational lensing and abundance measurements	
51	Shigeru Namiki	SOKENDAI, NAOJ
	[Oral Presentation] The environmental impacts on the mass-metallicity relation at z=1.52.	
52	Kin-Wang Ng 吳建宏	ASIOP&ASIAA
53	Atsushi Nishizawa 西澤淳	Nagoya University
	[Oral Presentation] Measurement of redshift dependent cross-correlation of HSC clusters and Fermi gamma-rays	
54	Masamune Oguri	University of Tokyo
	[Oral Presentation] An optically selected HSC cluster catalog	
55	Nobuhiro Okabe 岡部 信広	Hiroshima Univ.
	[Oral Presentation] Halo Concentration, Galaxy Red Fraction, and Gas Properties of Optically-defined Merging Clusters	
56	Taizo Okabe 岡部泰三	The University of Tokyo
	[Poster] Evolution of alignment angles between central galaxies and host dark matter halos in galaxy clusters	

57	Teppei Okumura 奥村哲平	ASIAA
58	Taira Oogi 大木 平	Kavli IPMU
	[Oral Presentation] Modelling galaxy quenching and spatial distributions of star-forming and quenched galaxies	
59	Ken Osato	The University of Tokyo
	[Oral Presentation] Cosmology and Cluster Astrophysics with WL and tSZ	
60	Naomi Ota	Nara Women's University
	[Oral Presentation] X-ray observations of optically-selected galaxy clusters in the Subaru HSC-SSP field	
61	Changbom Park	Korea Institute for Advanced Study
	[Oral Presentation] Cosmology with Fingers-of-God	
62	Youngsoo Park	Kavli IPMU
	[Oral Presentation] Cluster Observables and Mass Calibration: An Exercise in Robustness	
63	Annalisa Pillepich	MPIA Heidelberg
	[Oral Presentation] Stripping, quenching and morphological transformations of cluster galaxies according to the IllustrisTNG simulations	
64	Jinsu Rhee	Yonsei Univ.
	[Oral Presentation] Unveiling Quenching History of Cluster Galaxies Using Phase-space Analysis	
65	Eduardo Rozo	University of Arizona
	[Oral Presentation] Cluster Cosmology in the DES	
66	Hyunjin Shim	Kyungpook National University
	[Poster] Appearance of morphology-density relation at $z \sim 1.4$	
67	Jubee Sohn	Havard-Smithsonian Center for Astrophysics
	[Oral Presentation] HectoMAP Galaxy Cluster Surveys	
68	Veronica Strazzullo	Ludwig-Maximilians-Universität München
	[Oral Presentation] Galaxy populations in the most distant SPT-SZ clusters: the evolution of galaxies in the first massive cluster environments	
69	Tomomi Sunayama	Kavli IPMU
	[Oral Presentation] Analysis of systematic bias on lensing analysis using optical clusters	
70	Wei Leong Tee 鄭偉良	ASIAA
71	Chun-Hao To 竇俊皓	Stanford University
	[Poster] Evolution and mass dependence of the conditional luminosity functions of red galaxies in galaxy clusters	
72	Gabriel Torrealba	ASIAA
73	Jun Toshikawa	University of Tokyo
	[Oral Presentation] A systematic search for protoclusters based on Subaru/HSC survey	
74	Shutaro Ueda	ASIAA
75	Keiichi Umetsu	ASIAA

	[Oral Presentation] HSC Weak-lensing Analysis of XXL-selected Galaxy Clusters	
76	Benedetta Vulcani	INAF - OaPD
	[Oral Presentation] How fast is the evolution of galaxies in clusters?	
77	Ting-Wen Wang 王亭文	NTHU
78	Wei-Hao Wang	ASIAA
79	Jon Willis	University of Victoria
	[Oral Presentation] Matching the XXL and HSC-CAMIRA cluster samples: Lessons in selection bias and cluster astrophysics	
80	Kiyoto Yabe 矢部清人	Kavli IPMU
	[Oral Presentation] The current status of PFS project	
81	Howard Yee	University of Toronto
	[Oral Presentation] Star formation in cluster galaxies since z~1	
82	Sukyoung Yi	Yonsei University
	[Oral Presentation] Why are the galaxies in clusters gas poor? Lessons from simulations	