

# AGN and HSC: General Discussion

- 1) Science Topics, Sub-WGs, action items, and 1<sup>st</sup> Year Science Projects
- 2) HSC Data (incl. Commissioning Run Data) and Proposals
- 3) Follow-up: spectroscopy, observations in other wavebands
- 4) Software and Database Issues
- 5) PFS: Science Opportunities and Target Selection
- 6) Fostering Further Collaborations

# 1) Science Topics, Sub-WGs, A/I, and 1<sup>st</sup>-yr Sciences

- a) very high-z quasars (selection, contamination)
- b)  $z=4-5$  photometric selection (contamination, completeness, QLF)
- c) AGN science at lower redshifts
- d) clustering and environment
- e) lensed quasars
- f) quasar metallicity
- g) variability
- h) MIR
- i) x-ray
- j) radio
- k) models
- l) quasar photo-z

# Very High-z Quasars ( $z > 6$ )

**Kashikawa**, Imanishi, Matsuoka,  
Foucaud, Oyabu, Ishizaki, Goto, Asami, Strauss (+ Sorahana, Itoh)

1<sup>st</sup> year science opportunities

- Survey strategy and “ACTUAL” discovery at  $z \sim 7$
- Discovery at  $z \sim 6$  (~~with CIV-based  $M_{BH}$ ,  $L/L_{Edd}$ ,  $Z_{BLR}$ ,  $f_{HI}$ , ...~~)
- Galactic BD based on photometric sample (?)

A/I:

- Probabilistic selection?
- Completeness estimates based on actual HSC data
- Identifying problems in images; working with software team
- NIR data (UKIDSS/VIKING): examining actual data
- Repeat/confirming photometry
- Spectra: individual proposals? external collaborations?
- Optical follow-up imaging? → z-band proposal ?
- Preparation for ALMA & JVLA proposals
- Quasars at  $z \sim 8$  (??)
- Galactic BD sciences?: spatial distribution (?) Y dwarfs (??)
- How we should do for faint candidates in UD? without spec...

# $z=3-5$ Photometric Selection (lower redshifts too)

Ikeda, Akiyama, Strauss, Foucaud

Morokuma, MatsuokaY, Kawaguchi, Enoki, Hori, Nagao

1<sup>st</sup> year sciences

- Survey strategy (completeness/contami) and preliminary QLF

A/I:

- Probabilistic selection?
- Completeness estimates based on actual HSC data
- NIR data (UKIDSS/VIKING): examining actual data
- Spectra: individual proposals? external collaborations?
- Multi-color selection (not 2color-based)?
- Use of U-band data
- Effects of variability on the completeness estimates
- Completeness/contamination of stellarity criteria
- Effects of the Baldwin effect on the completeness estimates
- How we select  $z\sim 3$  through photometry?
- Proper motion (SDSS-HSC: a few yr time separation)?

# Clustering and Environment

Akiyama, **Strauss**, Hashimoto, Oguri, Kayo, Komiya,  
Shirasaki, Enoki, Nagashima, Ikeda, Silverman, Ishiyama, Foucaud

1<sup>st</sup> year sciences

- Cross correlation between SDSS quasars and HSC objects
  - ~  $z \sim 4$  g-drop LBGs detected with HSC (dependence on L)
  - ~ low- $z$  galaxies with photo- $z$  (dependences on gal. properties)
  - ~ ( cluster of galaxies (HSC red-sequence selected?) )

A/I:

- Spectra: individual proposals? external collaborations?
- HOD issues
- Revising our mock catalog. Next generation theoretical models.
- we should communicate with galaxy WG people!

# Lensed Quasars

Coupon, Oguri, Kayo, Inada, Morokuma, Foucaud, Yonehara

1<sup>st</sup> year sciences

- Multiple-image lensed quasar search → also host galaxy studies
- Morphology of SDSS quasars → lensed guys?

A/I:

- Spectra: individual proposals? external collaborations?
- Other follow-up needed? NIR imaging?

# Quasar Metallicity

MatsuokaK, Nagao, Sameshima, Kashikawa, MatsuokaY

1<sup>st</sup> year sciences

-- Z<sub>BLR</sub> evolution as a by-product of the collected spectra

A/I:

-- NIR follow-up spec?

-- Model predictions from our theoretical works?

→ Already build-in! (but TOTAL metallicity; Z)

→ Relative abundances can be also added (but tough issue)

# Variability

Morokuma, Minezaki, Kokubo, Kawaguchi, Yonehara

1<sup>st</sup> year sciences

- Long-term vari. with HSC & previous data → structure func.?  
~ if focusing on Subaru data (saturation is worried on SDSS obj)

A/I:

- Completeness (as func. of  $z$ ,  $L$ , ...)?
- Incorporating variability in target selection algorithms. Further understanding of its effect on selection function.



# MIR

Oyabu, Aoki, Oi, Ohyama, Foucaud, Hanami, Fujishiro, Kouzuma, Capak et al. (SPLASH team) **Silverman**

1<sup>st</sup> year sciences

-- WISE-selected extremely red quasars?

A/I:

-- Completeness/contamination (?)

-- Spectra!

-- Use of SPLASH dataset (spa. resolution ~3-4")

~ Host galaxies of low-L AGNs at  $z \sim 1$  (rest K)  $\rightarrow M_{\text{star}}$

~ extremely high- $z$ !

# X-ray

Terashima, Iwasawa, Akiyama, Ueda, Noda, Hashimoto, Kawaguchi

1<sup>st</sup> year sciences

- Peculiar-SED objects ( $\alpha_{ox}$ ,  $\alpha_x$ , ...)
  - ~ from HSC-XXL cross-matching
  - ~ utilizing Chandra & XMM serendipitous source catalogs
- 2color-selected  $z=4-5$  X-detected “clean” quasar sample
  - ~ including obscured pop.  $\rightarrow f_{obs}$
- Optical counterparts of opt-undetected Chandra obj. @cosmos?
  - ~ data coming within 1 yr

A/I:

- Spectra!
- X-ray follow-up of interesting AGN we discover

# Radio/Sub-mm

Imase, Nagao, Strauss

1<sup>st</sup> year sciences

- Optical counterparts of opt-undetected FIRST sources
- Search for extremely radio-loud AGNs

A/I:

- New members needed...
- Inviting radio astronomers?
- Use of ACT dataset? ACT survey parameters?
- JVLA new survey? parameters??
- CCAT (timescale is probably too long)
- Japanese Radio Community Meeting @ Mitaka (→ Imanishi-san)

# Models

Wada, Nagashima, Enoki,  
Kawaguchi, Kawakatu, Ishiyama, Kobayashi, Ohsuga, Nomura, etc.

1<sup>st</sup> year sciences

- AGN Downsizing

A/I:

- Next SWANS-theory Sub-WG meeting?

- Updating mock catalogs based on Ishiyama-san's new outcomes

# Target Selection and Science Opportunities for Sumire/PFS

- How will AGN be selected in wide survey?  
Deep survey?
- How will AGN be recognized from spectra of galaxy sample? [See Tanaka et al.](#)
- Working to prepare the SSP

# Quasar Photo-z

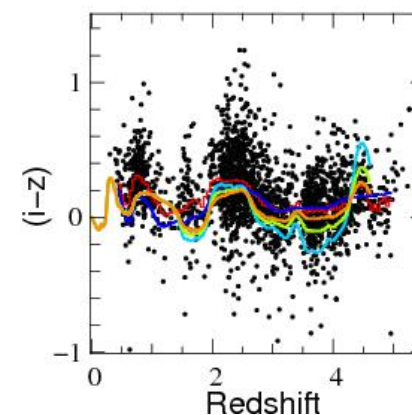
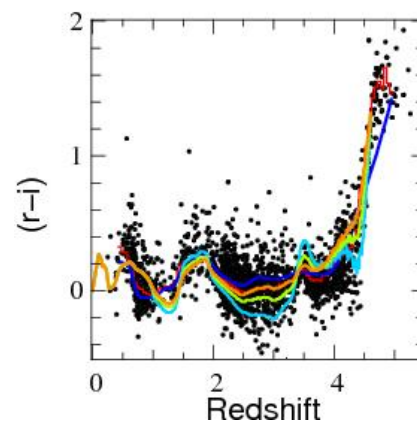
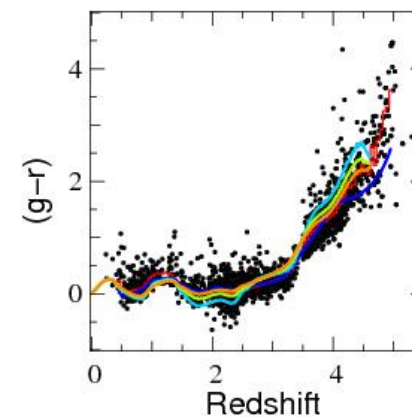
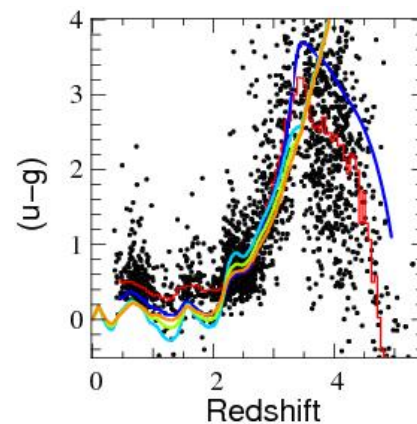
Tanaka, Coupon (with photometric property guys!)

1<sup>st</sup> year sciences

-- (for various specific sciences)

A/I:

- Adding MIR component
- Effects of variability?
- Baldwin Effect?



Quasar colors as a function of redshift, from BOSS quasar catalog. Paris et al. 2012

## 2) HSC Data and Proposals

- a) HSC commissioning run
  - Where are the ideal target fields for us?
- b) SSP 1<sup>st</sup> year observation
  - Where are the ideal target fields for us?
    - ~ VIKING (specifically GAMA), XXL (K~22)
- c) Requirements for data reduction software
  - Continuous interaction with the software WG needed
  - See next PPT page

# More on Software

- We all need to understand the strengths and limitations of the HSC pipelines.
- Working with the early data will reveal problems and features: we need to be in tight communication with software team.
- Features we identified we would like:
  - Image subtraction
  - Multi-epoch photometry
  - PSF + galaxy photometry
  - Database structure allowing matches with external photometry.



## 2) HSC Data and Proposals (contd.)

### d) Proposals for spectroscopic follow-up observations

- Need some coordination? through Telecon
  - ~ to maximize the multiplicity of spectrographs
  - ~ to avoid submissions of multiple similar proposals
- To which telescopes?
  - ~ Subaru, Gemini, Keck
  - ~ Subaru-VLT time-exchange program??
  - ~ Smaller (but still useful) Telescopes: APO, WHT, AAO (?)
    - ~ access from Princeton to APO: end at summer 2014
    - ~ CFHT/MegaCAM/WIRCAM (from Taiwan) useful for

optical imaging!

- Proposal BEFORE data? Maybe NOT convincing?
- Approach from BOTH JP and Princeton
  - ~ dividing our target lists into two

### e) Proposals for multi-wavelength dataset

- u-band (→ Seb) in UD (next semester: SXDS done)
- VISTA for the HSC deep layer (40n); discuss with F & Brazil
- ALMA, JVLA (?)
- see also next page

# Instrumentation Issues

- Status of HSC itself; detailed plans for upcoming commissioning run
- Status of z-band filter?
- Status of narrow-band filters?

## Other surveys to watch:

- VISTA
- JVLA (proposing obs. 0.2 mJy for wide layer)
- Euclid
- eROSITA
- Looking forward to TMT, JWST

### 3) Fostering Further Collaborations

- a) Announcing our projects to the collaboration.
- b) For keeping our activities...
  - “Sub-WG activities” as mentioned earlier in this ppt
  - Sub-WG face-to-face/skype meetings (cf. SWANS-theory)
- c) Encouraging further participations of young PDs/students
- d) Next meeting?
  - Joint meeting with the galaxy evolution WG?
  - Apr/May? Just after commissioning data delivery
  - At where? (NAOJ or IPMU would be convenient...)  
Coordination with COSMOS meeting in Kyoto?
  - Strauss-san will talk to Takada-san
- e) Any other good ideas/suggestions?