Instrument Planning Meeting 2014/10/24

I. Iwata

Discussion Items

- Science Output Performance of Instruments
  - Preliminary results from Publication Survey
- NsIR Plan
- NsOpt Plan
- Cs Plan
- Time Exchange Programs
- Budget Perspective

Inst. Planning Task Force

- To collect information required for planning
  - Science output performance
  - Demands
  - New instrument commissioning plans
  - Instruments of Keck and Gemini, including new instrument plans
  - Instruments / plans of other >6m-class telescopes
  - Instrument troubles, loads of maintenance
- To create a draft plan
  - To be discussed in internal meeting(s), Subaru Advisory Committee
- Joint activity with SAC

Subaru New Instruments

PI-type Instrument Schedule

https://docs.google.com/a/naoj.org/spreadsheets/d/19Befrc3jQHfCbsw70lNpv0MiAxWNHw2Ah3klB6piP6s

Instrument	PI	PI institute	08A	08B	09A	09B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B	18A	18B	19A	19B	20A	20B	
Cs Instruments																													
K3D2 (Cs)	H. Sugai	IPMU																											
MIMIZUKU	T. Miyata	U. Tokyo																											
SWIMS	K. Motohara	U. Tokyo																											
Ns/Other Instruments																													
HiCIAO	M. Tamura	U. Tokyo																											EFL: 2008/12/21
K3D2+AO188	H. Sugai	IPMU																											EFL: 2012/04/02
SCExAO	O. Guyon	Subaru																											EFL: 2011/08/09
RAVEN	C. Bradley	U. Victoria																											EFL: 2014/05/13
IRD	M. Tamura	U. Tokyo																											
GIGMICS	Y. Hirahara	Nagoya U.																											
CHARIS	N. J. Kasdin	Princeton U.																											

cf. Facility Instrument

PFS	H. Murayama	IPMU																											

Science Operation Phase
Engineering Phase
TBD

PFS Operation Plan

- HSC ↔ PFS-PFI Exchange (POpt2) almost every month?
  - One PFS (and HSC) observation run in every two month (on average)?
- Double exchange (Top-unit and Cs)?
- Spectrographs are cooled down all the time?
  - Temperature control of the spectrograph room
- Classical observation at the beginning, and then moving to Queue-mode?
- Frequency of dome flat? Other calibration requirements?

ULTIMATE-SUBARU Plan

- Phase-0.5: ‘Starbugs’ Fibre positioner at Cs + MOIRCS (at Observation floor?)
  - no AO assist
  - From 2018?
- Phase-1: Adaptive Secondary Mirror - GLAO implementation
  - Reuse existing IRM2
    - Downtime of IRM2?
  - Multiple fibre lasers and WFS at Cs
    - FoV enlargement
  - From 2021?
- Phase-2: New (Wide-field) IR instruments
  - GLAO + Narrow-field high strehl AO
- IRMS + Subaru before TMT?
  - Feasibility study started

Science Output Performance

Plans for NsIR, NsOpt, Cs

NsIR Plan

- Decommission of HiCIAO
- Plans for IRCS and AO188
- Feasibility of IRD, SCExAO, CHARIS observations w/o IRCS
    - IRD team proposes 35 nights / semester (half night x 7 nights x 5 runs per semester) for 4 years
    - CHARIS: starting from 2016
    - SCExAO long-term plan?

NsOpt Plan

- Plans for HDS
- Multi-Object mode
- Possibility of transfer to other telescope?
- Uniqueness of HDS among Optical high resolution spectrographs?
- Workhorse instrument with relatively high (and stable) science performance

Cs Plan

- PFS metrology camera
- SWIMS proposal (received in Sep. 2014)
  - Hilo (2015/12 - 2016/05)
  - Summit (2016/06 - 2016/09), Engineering Obs. (- 2017/01)
  - Science Obs. (2017/02 - 2018/06)
  - Transport to TAO (2018/06-)
- MIMIZUKU proposal:
  - Received in 2012; need update
- Closure of COMICS during MIMIZUKU operation
- Closure of MOIRCS during SWIMS operation
- Plans for FOCAS

Time Exchange Programs

Gemini Instruments

North

GMOS	Optical MOS+Imager
NIRI	1-5µm Imager w/AO
NIFS	1-2.5µm IFS
GNIRS	1-5µm Spectrograph w/AO

South

GMOS	Optical MOS+Imager
GSAOI	0.9-2.4µm Imager w/GeMS
GPI	AO Imaging Polarimeter + IFS
FLAMINGOS-2	NIR MOS+Imager

Future instruments:

GRACES (Remote access to ESPaDOnS), GHOST (High-dispersion optical spectrograph)

Current Instrumentation

Site	Instrument		FoV, Mode, Resolution	AO Support
Gemini-N	GMOS-N	360-940 nm	img 5.5'x5.5' LS, MOS, IFS (5"x7") R:600-4,000	(ALTAIR)
	NIRI	1-5 μm	img 20"x20" - 120"x120" ~~LS R:500-1,000~~	ALTAIR
	NIFS	950-2400 nm	IFS (3"x3") R:5000	ALTAIR
	GNIRS	1-5 μm	LS R:1,800-18,000 (+img)	ALTAIR
Gemini-S	GMOS-S	360-940 nm	img 5.5'x5.5' LS, MOS, IFS (5"x7") R:600-4,000	(GeMS)
	GSAOI	950-2400 nm	img 85"x85" with MCAO	GeMS
	FLAMINGOS-2	950-2400 nm	img 6.1' ∅ LS, (MOS) (2'x6') R: 1,200-3,000	(GeMS)
	GPI	900-2400 nm	IFU 2.8"x2.8" contrast: 10^7 at 0.4"	XAO
Location TBC ~2018	*(GHOST)*	360-1000 nm	2 IFUs in 7' ∅ R: 50,000 + 75,000	(None)
Visiting	TEXES (GN)	5-25 μm	LS R: 4,000 - 85,000	none
	DSSI (GN)	400-1000 nm	Dual EMCCD imaging, 20 mas resolution@650nm	speckle
	(GRACES)	~600-1000 nm	see CFHT/ESPaDOnS - high-res. spectrograph	none

NEW

Your visitor instrument could be here!!

Gemini launched a call for Feasibility studies for the next facility class instrument: http://www.gemini.edu/node/12266

GRACES from 2015B onwards

Successful commissioning of GRACES: 270m fiber feed into ESPaDOnS

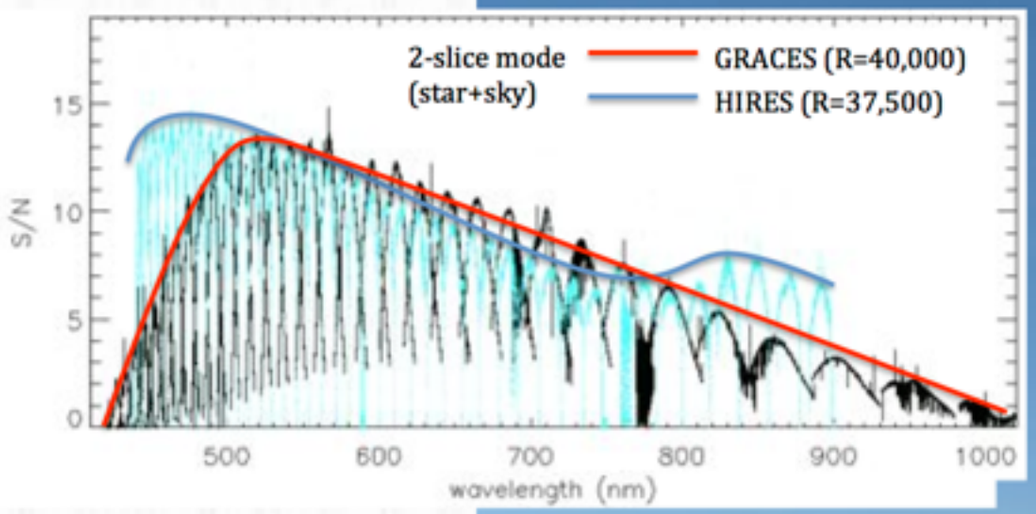


Figure 1: Comparison of the S/N for a 1sec exposure on Feige66 in the star+sky configuration.

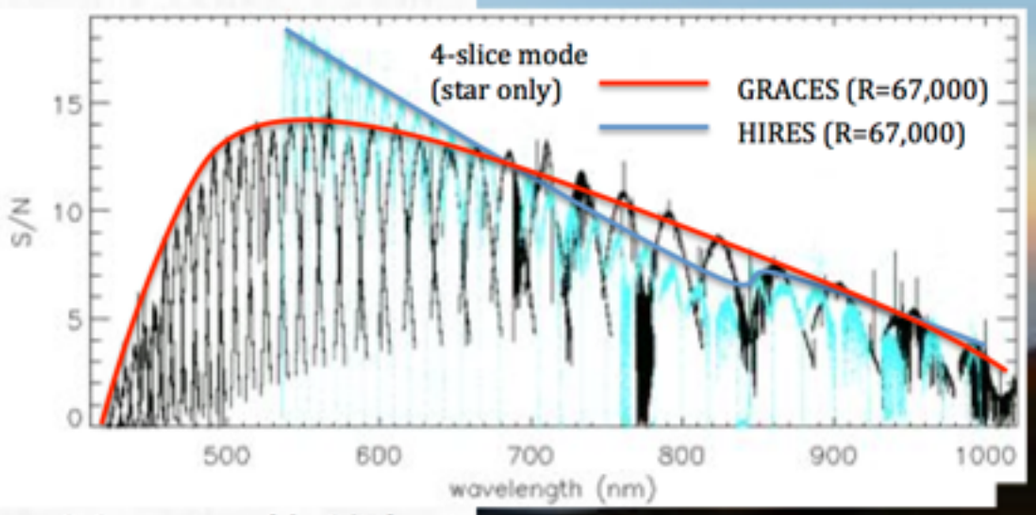
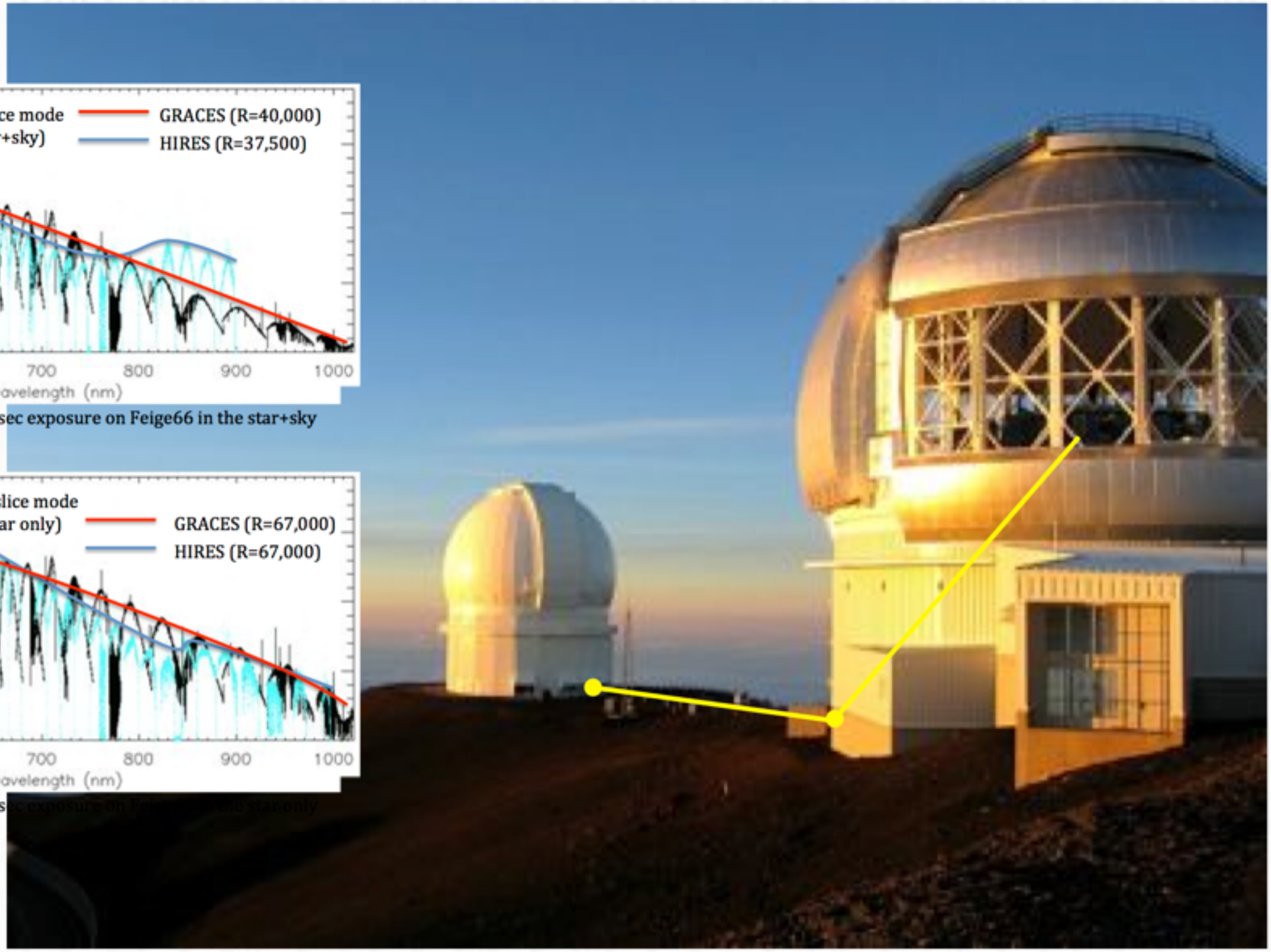


Figure 2: Comparison of the S/N for a 1s exposure on Feige66 in the star only configuration.



Keck Instruments

Keck I

HIRES	0.3-1.0μm High-dispersion Sp.
LRIS	0.3-1.0μm MOS+Imager
MOSFIRE	0.9-2.5μm MOS+Imager
OSIRIS	NIR IFS w/AO

Keck II

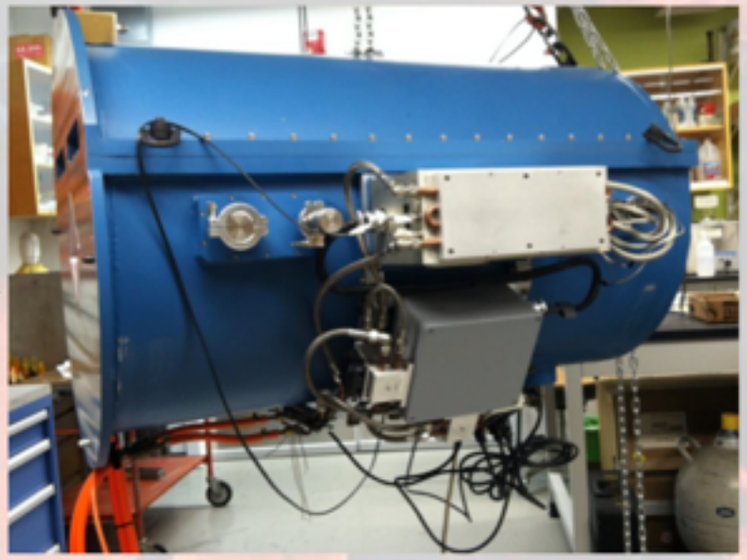
DEIMOS	0.4-1.0μm MOS+Imager
ESI	0.4-1.1μm High-dispersion Sp.
NIRC2	0.9-5.3μm Imager+Sp. Coronagraph
NIRSPEC	0.9-5.5μm Echelle Sp.

Future instruments:

KeckII: KCWI, NIRES

NIRES

- Near-IR Echellette Spectrometer
- 1.0 to 2.45 μm at R~2,700
- Fixed 0.55" slit
- Slit viewing camera with 2.1' x 2.1' FOV, Ks, Hawaii-1 detector
- H2RG science detector
- Active flexure correction
- Located on Keck II
- Available for shared risk in 2015A



NIRES in the lab at Caltech

KCWI – Key Performance Parameters

Parameter	Value
Field of View	Selectable: 20" x (8.4|16.8| 33.6)"
Spatial Res./Sampling	Selectable: 0.35" x (0.35|0.7|1.4)"
Spectral Resolution	Selectable: 1,000 to 20,000
Bandpass (blue + red)	350 to 1050 nm (blue channel 350 to 560 nm) (red channel 530 to 1050 nm)
Efficiency	>40% (instrument)
3σ Sensitivity in 1 Hour	10^{-7} to 10^{-6} ph/s/cm^2/arcsecond^2/Å
Light Bucket Sensitivity	200 LU in 10 hours
Background Subtraction	0.01% of sky
Plate Scale	0.15" pixel^{-1}