

岡山近赤外撮像・分光装置 ISLE の 現状報告

2009/08/20

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Talk plan

1. ISLE の紹介
2. 昨年度運用実績
 1. 検出器の交換
3. 今後の予定

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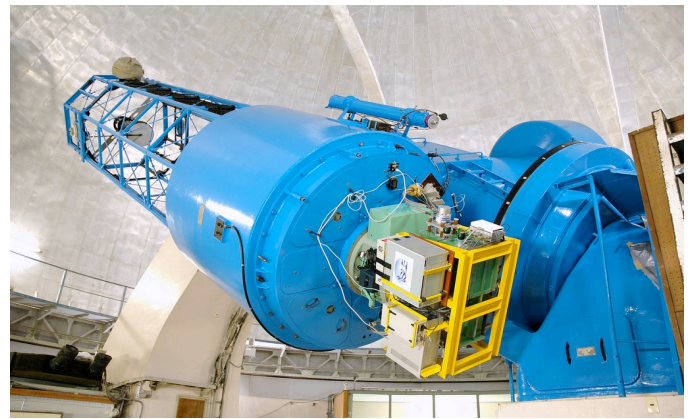
ISLE

- OASIS のグレードアップ後継機
 - HAWAII (HgCdTe 1024×1024)に更新
 - 光学系も更新
 - 4.2 × 4.2 arcmin², 0.25 arcsec/pix
- 撮像(13 Filters)
 - 2006B から撮像モードの共同利用開始
- 分光 (4 arcmin long-slit, R=300-4,000)
 - 2009Aから分光モードの共同利用開始

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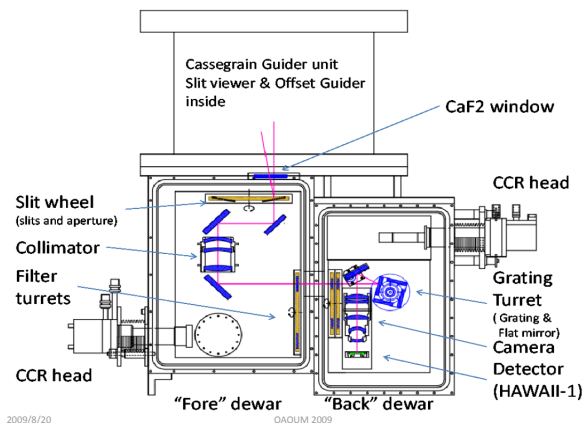
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Institute	Okayama Astrophysical Observatory
Telescope	1.88-m telescope
Instrument	ISLE
Available mode	Imaging, Long-slit Spectroscopy
Year of First Light	2005
Array Detector	HAWAII-1 (HgCdTe/PACE, Rockwell)
Format	1024 × 1024
Wavelength Coverage	1.0 – 2.5 μm
Pixel scale	0.25 arcsec/pix
Field of View	4.2 × 4.2 arcmin ²
Filters	J, H, K, Short – K and narrow band filters
Spectral Resolving Power	$\lambda/\Delta\lambda$: 1000 – 4000
Slit length	4.0 arcmin
Slit width	1.0, 1.5, 2.0, 5.0 arcsec
Gratings	G1 ... 300 groove/mm, $\theta_B = 22^\circ$ G2 ... 300 groove/mm, $\theta_B = 31^\circ$
Conversion Factor	3.3 e ⁻ / ADU*
Readout Noise	8 e ⁻
Dark Current	0.2 e ⁻ /sec @ 80K
Full Well	100,000 e ⁻
Array Controller	Messia 5 + dedicated front-end

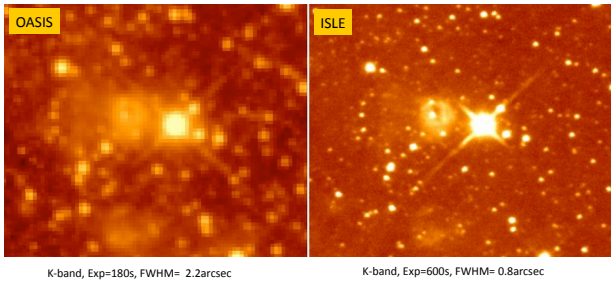
* The conversion factor was determined by "noise squared versus signal" method.

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ISLE imaging: upgrade effectiveness



K-band, Exp=180s, FWHM= 2.2arcsec

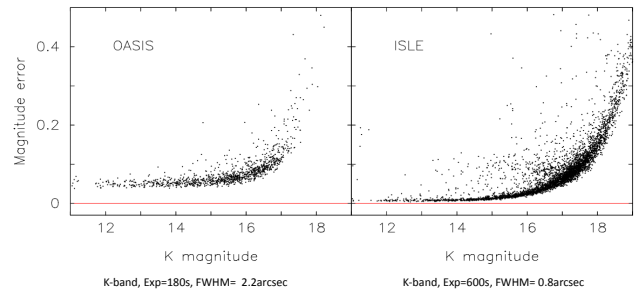
K-band, Exp=600s, FWHM= 0.8arcsec

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ISLE photometry of W49A



K-band, Exp=180s, FWHM= 2.2arcsec

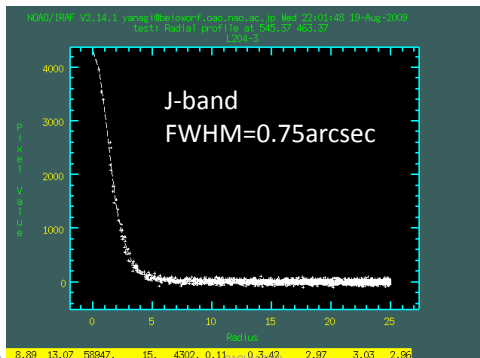
K-band, Exp=600s, FWHM= 0.8arcsec

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かなり良好な結像性能



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8.89 13.07 58947.15. 4302. 0.11 0.3,42 2.97 3.03 2.96

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ISLE spectroscopic configurations

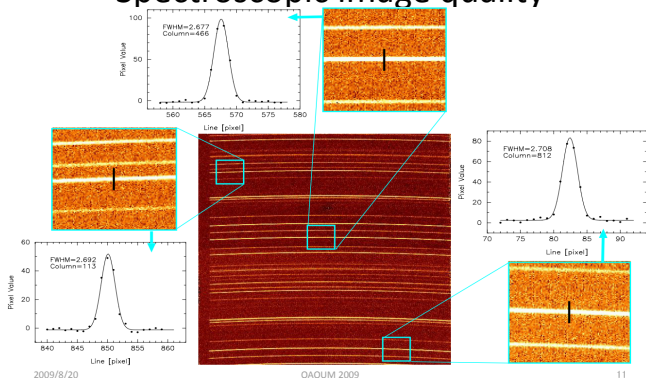
Spectral Resolving Power	$\lambda/\Delta\lambda$: 300-4,000
Slit length	4 arcmin.
Slit width	1.0, 1.5, 2.0, 5.0 arcsec
Gratings	G1 ... 300 groove/mm, $\vartheta_B=22^\circ$
	G2 ... 300 groove/mm, $\vartheta_B=31^\circ$
	G3 ... 75 groove/mm

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Spectroscopic image quality

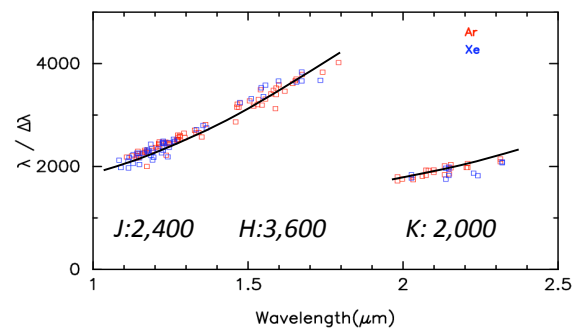


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ISLE Sp. Resolution :Medium Dispersion

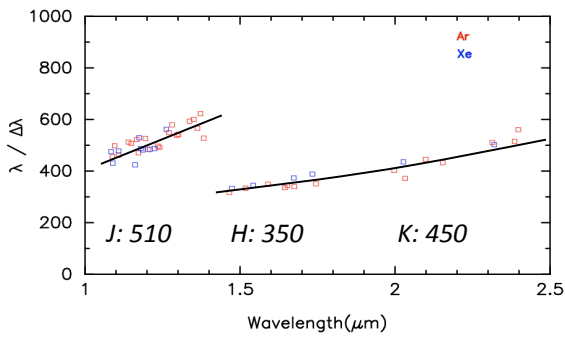


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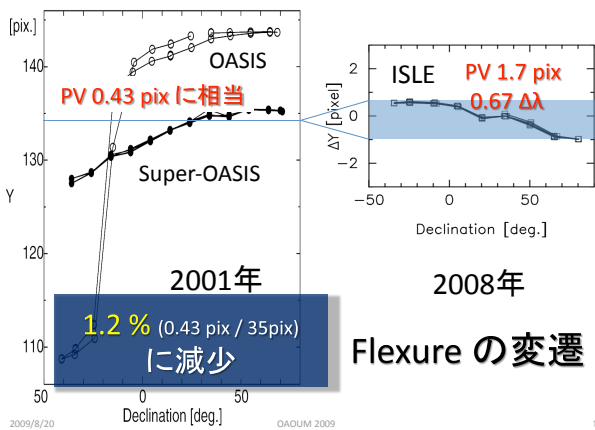
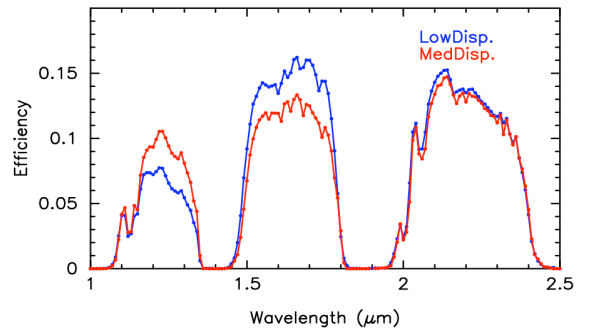
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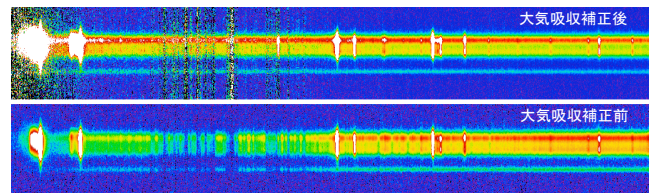
ISLE Sp. Resolution: Low Dispersion



低分散・中分散回折格子の分光効率比較



NGC7027 J-band spectra

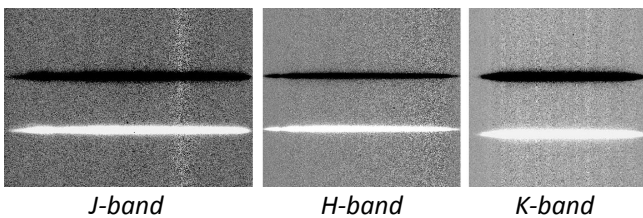


P18: 大塚・他 参照

低分散スペクトル例

Dembouska : K=9.5

各バンド露出時間は60秒程度

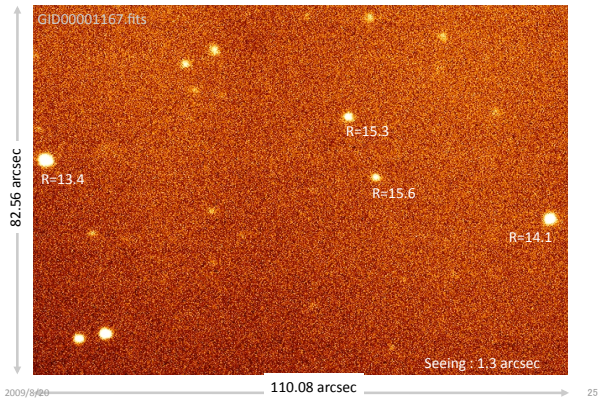


P19: 黒田・他 参照

本 UM における ISLE 関連の研究発表

- P05
誘発的星形成領域BRC13の近赤外撮像観測
林実幸 (神戸大学)
- P06
若い星に付随するジェットの探査
中岡正奈 (神戸大学)
- P18
ISLEスペクトルをもちいた惑星状星雲NGC 7027の元素組成解析
大塚雅昭 (Space Telescope Science Institute)
- P19
ISLEによる小惑星(349)Dembowskaの低分散分光観測
黒田大介 (国立天文台)

Cassegrain Offset Guider Camera



運用状況
装置トラブル
主要な機能更新

昨年度運用実績

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この1年の運用状況

- 共同利用3年目(2006Bより)
 - 共同利用実績:
 - 2008B: 0夜(0件) / 107夜(12件) 0%
 - 2009A: 9夜(2件) / 117夜(14件) 8%
 - 撮像1件、分光1件
 - 合計: 9夜(2件) / 224夜(26件) 4%
 - 取得フレーム数
 - 11,579 frame (Eng. Time を含む)

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トラブルなど

- 前置光学系用冷凍機のOVER LOAD
 - 症状: 連続運転中に2日に1度の頻度で停止
 - 原因: 観測所内の電源系配線
 - 対処: 単相200Vを新たに敷設
 - 対処後: 現在は問題なく動作

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1年間の主要な機能向上・他

- Science Grade Array のインストール
 - 詳細は後ほど
- 波長較正ランプ追加
- 各種マニュアル、参考資料の充実
 - Home Page 参照.
 - Exposure Time Calculator(撮像、分光),
 - Spectral Line Atlas など
- SMOKA
 - 間もなく ISLE のデータ公開へ

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ISLE - Infrared Imager/Spectrograph for the OAO 188cm Telescope - Muriel's Firefox

観測計画マニュアル
Exposure Time Calculator(撮像、分光),
観測マニュアル
Spectral Line Atlas (OH, Xe, Ar)など

General Information

A brief description of ISLE (in Japanese)

- 岡山近赤外線撮・分光装置(ISLE)国立天文台ニュース No.188 で紹介した記事を再構成したページ)

Summary

- ISLE is a near-infrared (1.0-2.5μm) imager and spectrograph for the Cassegrain focus (f/18) of the 1.88 m telescope at Okayama Astrophysical Observatory. The detector is a HAWAII 1K x 1K HgCdTe Array, which covers 4.3 x 4.3 arcmin² field of view with a pixel scale of 0.25 arcsec/pixel. ISLE also provides medium (R=1,000 - 4,000) resolution long-slit (4 arcmin long) spectroscopic capabilities using reflection gratings.
- ISLE is available for the semester 2008B on a shared-risk basis.
- Publications based on data obtained with the ISLE should quote the following reference paper: Yanagisawa et al., Proc. SPIE, Volume 6209, pp. 62093Q (2008).

Contact Information

- All questions related to observations and proposal preparation should be addressed to Yanagisawa K. (e-mail: yanagi@cao.nao.ac.jp), P.I. of the instrument.

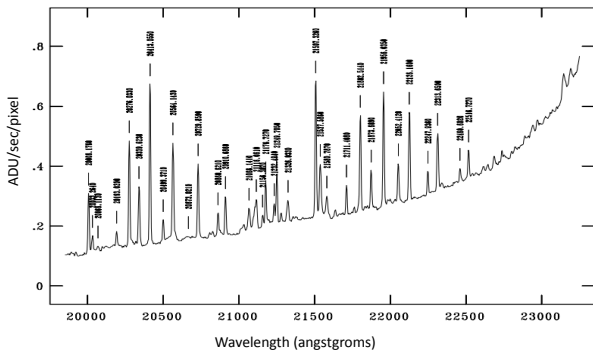
ISLEadmin, 30 April 2009 (created 5 March 2009)

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Spectral Line Atlas: OH, Xe, Ar



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Publications with ISLE

- Scientific Papers
 - Imada *et al.* (2009), CCD Photometry of a Newly Confirmed SU UMa-Type Dwarf Nova, *NSV 4838, PASJ*, **66**, pp.535-541
 - Kato *et al.* (2009), SDSS J080434.20+510349.2: Eclipsing WZ Sge-Type Dwarf Nova with Multiple Rebrightenings, *PASJ*, **66**, pp. 601-613
- GCN Circular
 - Yoshida, *et al.* (2009), GRB 090423: Near infrared observation at Okayama Observatory, GCN CIRCULAR, NUMBER 9218
 - Yoshida, *et al.* (2009), GRB 090426: Near infrared observation with ISLE at OAO, GCN CIRCULAR, NUMBER 9267

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ISLE image of GRB090423 in J-band
The most distant ($z=8.2$) object known!



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HAWAII-1 #271 Evaluation Results

Summary

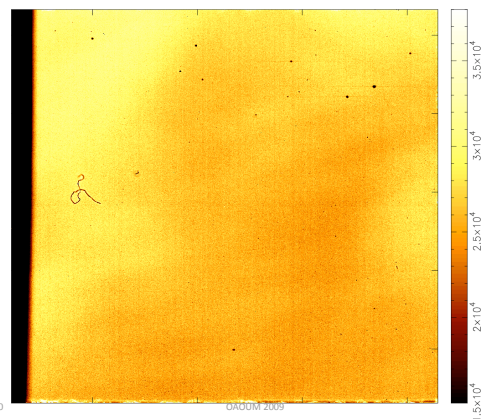
Cosmetics	Acceptable
Linear Range	< 25,000 ADU
Full Well Level	49,000 ADU
Conversion Factor	3.4 e ⁻ /ADU
Total Read Noise	9-11 e ⁻

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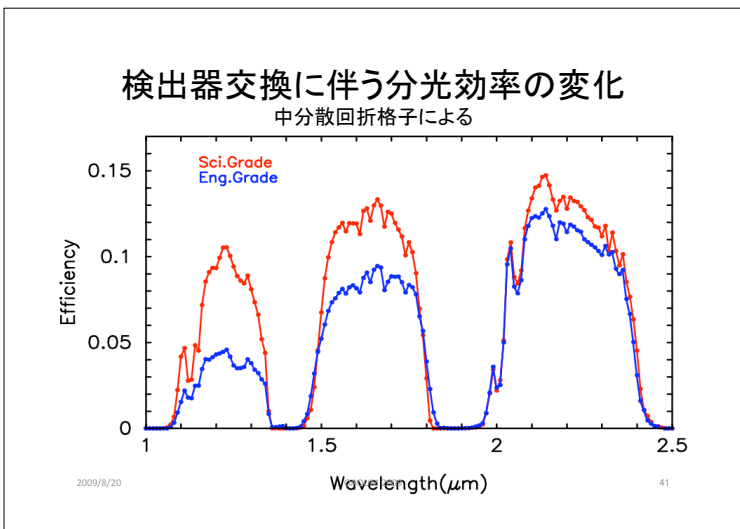
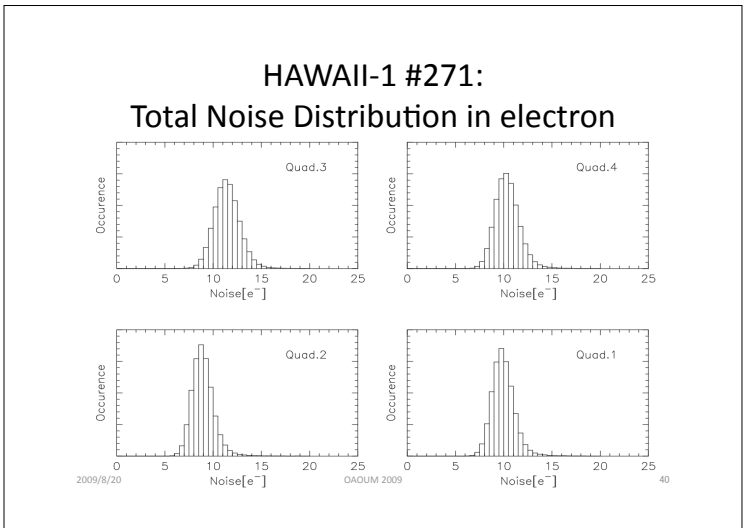
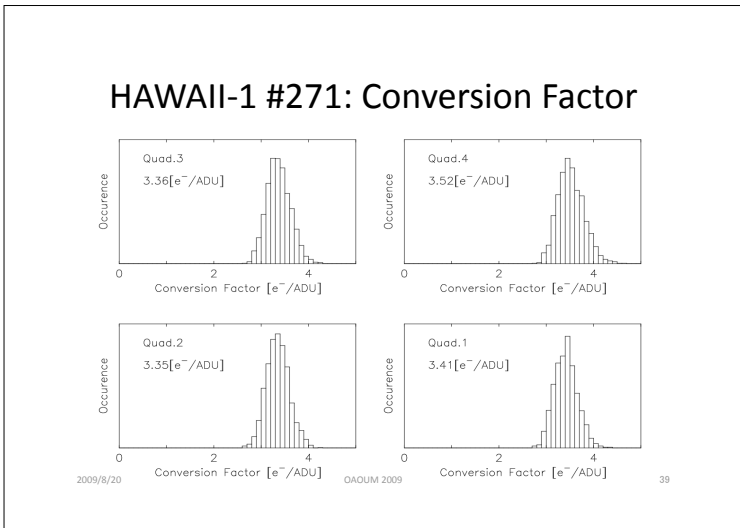
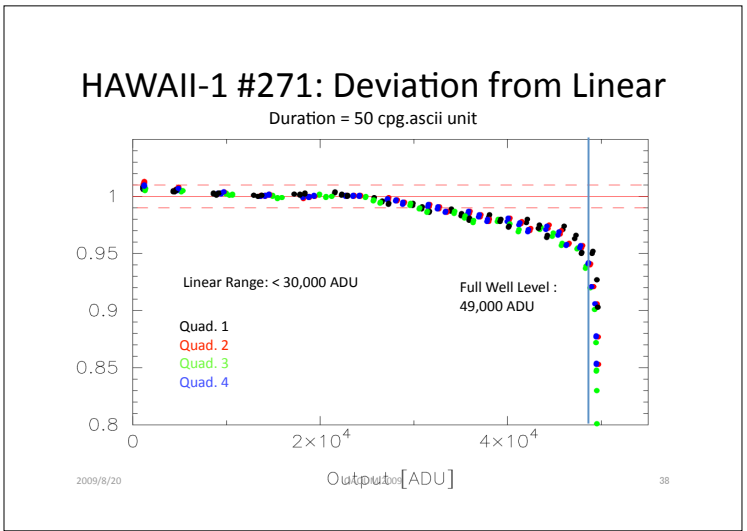
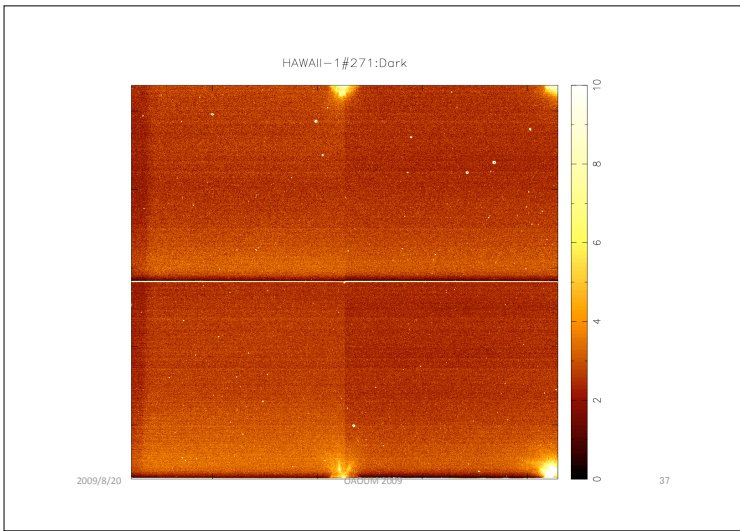
HAWAII-1#271:illuminated



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今後の装置改修計画
2009A の公募
今後の予定

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今後の装置改修計画

- 分光モード観測支援機能の充実
 - Offset guider : 微分大気差を考慮した guide 機能の組み込み
 - Slit Viewer : 微分大気差を考慮したスリット位置表示機能の組み込み
- フリンジ除去の研究
 - 中分散スペクトルには検出器フリンジ

2010A 公募

- 撮像モード
 - 公開(制限なし)
- 分光モード
 - 試験的な公開
 - Shared Risk
 - 申請に先立ち、PI(柳澤)まで連絡ください。