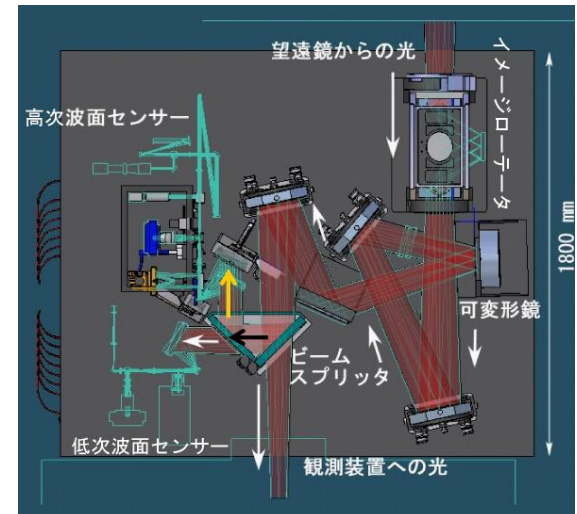


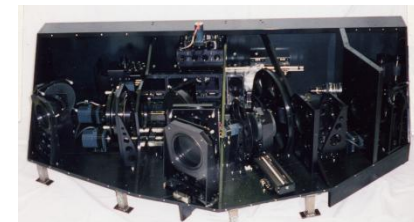
Kyoto 3DII (3DII) + AO188

2011 Jan 18 JST

1. What is 3DII?
2. Purposes of 3DII + AO188
3. What is needed for this?
4. Present status
5. Cass or Nasmyth in future?
6. Proposed schedule



http://optik2.mtk.nao.ac.jp/~minoways/AO_session/tutorial/index.htmlより

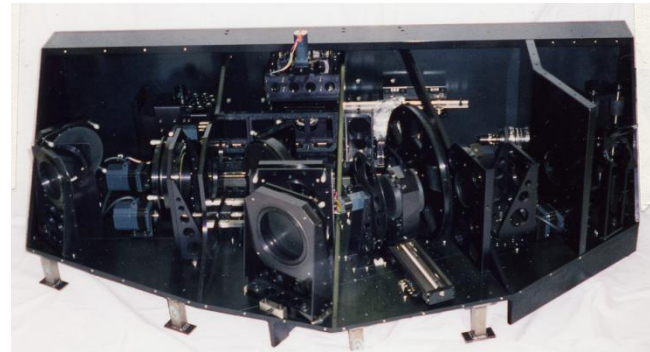


[I am sorry but some parts are written in Japanese.]

What is 3DII?

- Multi-mode spectrograph
 - includes Integral field spectrograph (IFS) mode, Fabry-Perot mode, etc.
- Optical wavelength (360-900nm)
- **Now** used at Subaru **Cassegrain** Focus

“The Kyoto Tridimensional Spectrograph II on Subaru and the University of Hawaii 88-inch Telescopes”, Sugai et al., 2010, PASP, 122, 103



Present members in Kyoto Univ.:

Sugai(PI), Matsubayashi, Nakajima, Yoshimura
cf. Shimono, Akita, Hattori

In the case of Cassegrain

Table 1. Observing Parameters

OBSERVATIONAL MODE	ON SUBARU (8.2 m, F/12.2)
Fabry-Perot	$0''.056 \text{ pixel}^{-1}$ ^a Field of view $1'.9 \times 1'.9$ ^b (Velocity shift $\Delta v \text{ (km s}^{-1}\text{)} = 980 \times (\theta')^2$) $R \equiv \lambda/\Delta\lambda \sim 400$ and 7000 (400 – 700 nm) ^c
Integral field spectrograph with a microlens array	<u>$0''.093 \text{ lens}^{-1}$</u> Field of view $3''.4 \times 3''.4$ Number of spectra $\simeq 1000$ $R \simeq 1200$ (360 – 900 nm) ^{d,e}
Long slit	Width $0''.12$, $0''.19$, $0''.56$ or Width $0''.17$, $0''.62$, $2''.1$ Length $1'.5$ $R \simeq 1200$ for $0''.12$ slit ^d
Narrow-band imaging	$0''.056 \text{ pixel}^{-1}$ Field of view $1'.9 \times 1'.9$



At Subaru:
August 2002

Purposes of 3DII + AO188

- **First optical** instrument used with AO at 8-10m class telescopes
 - ~0".1 **spatial sampling** of 3DII
- **Providing evaluation** of AO188 in optical wavelengths

Expected improvements with AO (IFS mode)

(下農他 2005, すばるUMポスターより)

AO188 で期待される星像シミュレーション (R band/7000A)

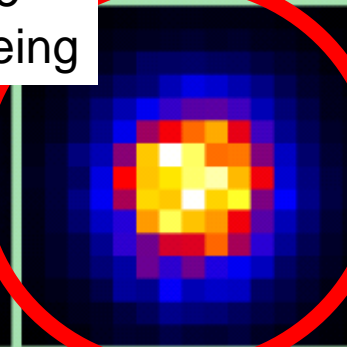
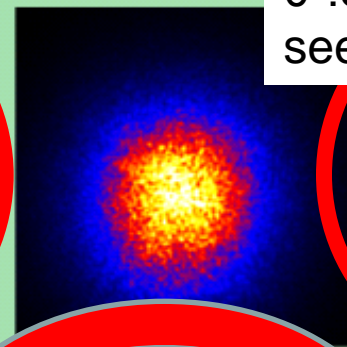
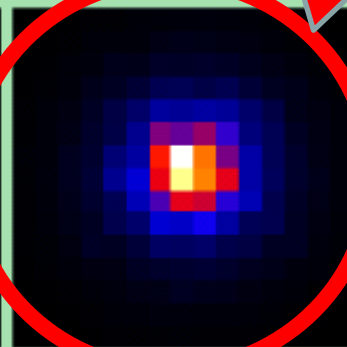
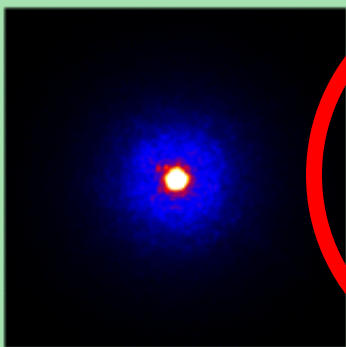
各パネル右側イメージのサンプリング Kyoto3DII 面分光モードでのもの
左側イメージは AO グループ (Guyon 氏) によるもの

10mag GS

20mag GS (AO無しに相当)

0".50 seeing

0".5 seeing

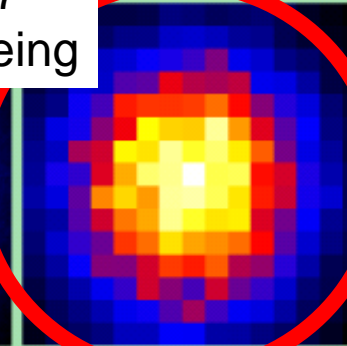
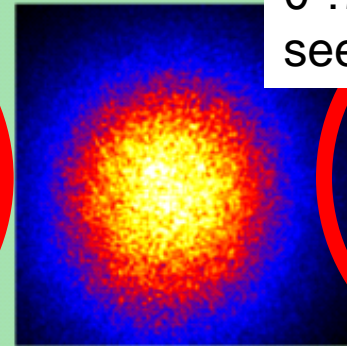
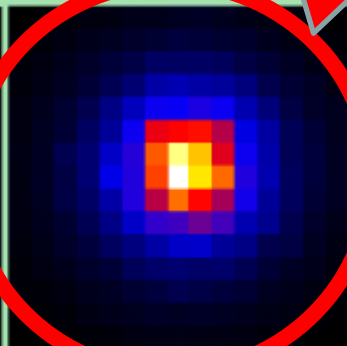
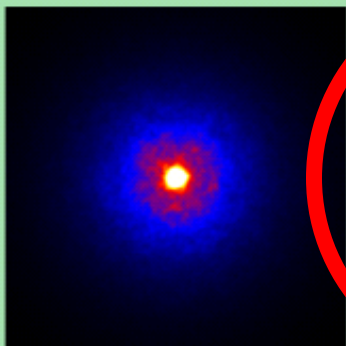


FWHM = 0".021 ; E50 = 0".18

E50 = 0".30

0".70 seeing

0".7 seeing



FWHM = 0".033 ; E50 = 0".28

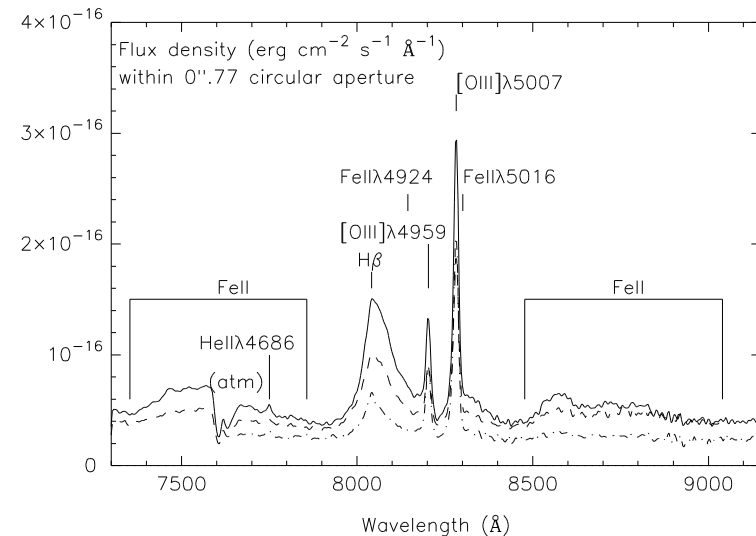
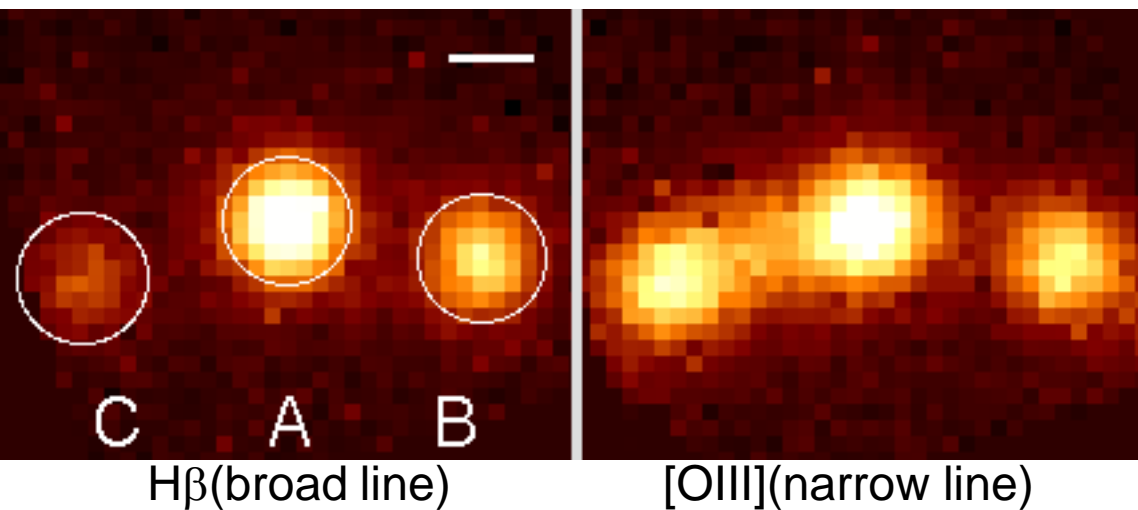
E50 = 0".40

AO 無しの場合 (ガウス分布) において E50, E80 と FWHM の関係は
(E50) = 0.64 (FWHM), (E80) = 1.21 (FWHM) となる

(E50 : エネルギー積分値が 50% になるような直径)

An example of present 3DII results

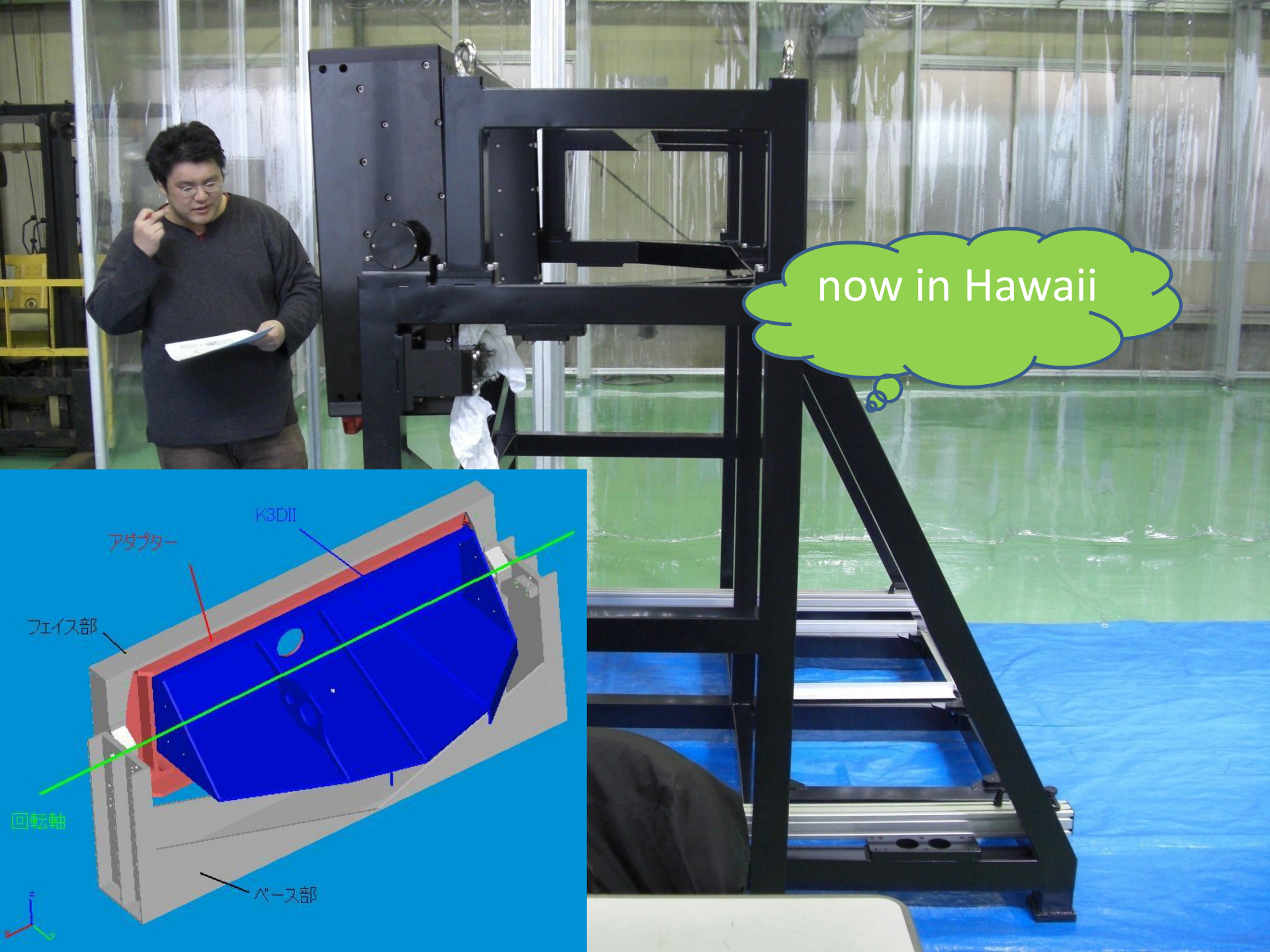
IFS of gravitationally lensed Quasar ($Z=0.658$)



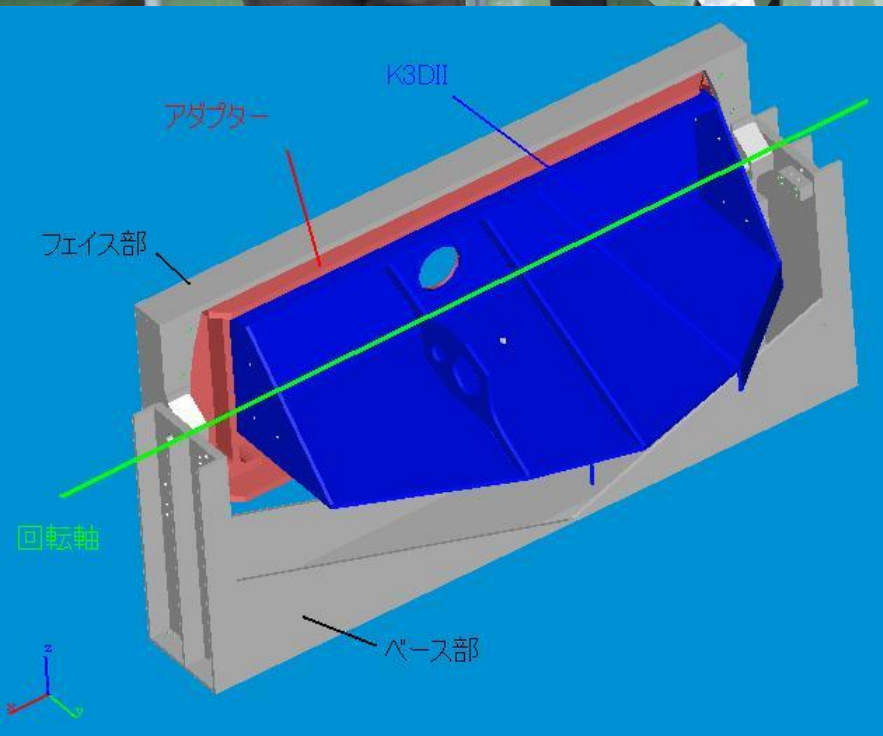
白い棒線が $0''.5 = 2.2\text{kpc}$ at $z_{\text{lens}}=0.295$ 。最も暗い像Dは視野外。

What is needed for this?

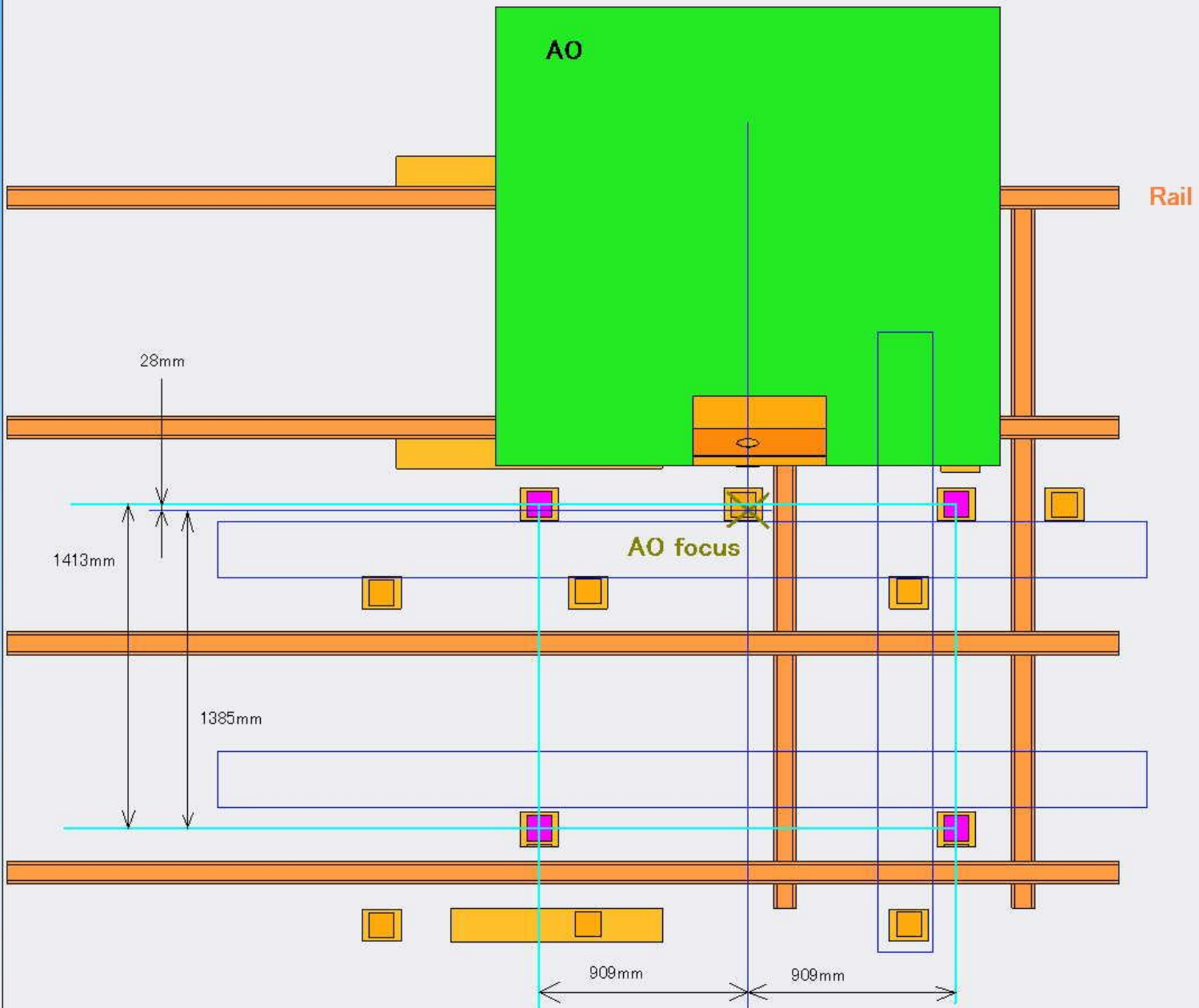
- Mechanical interface
 - Nasmyth Mount
 - Four fixed points
- Optical interface
 - dichroic mirror



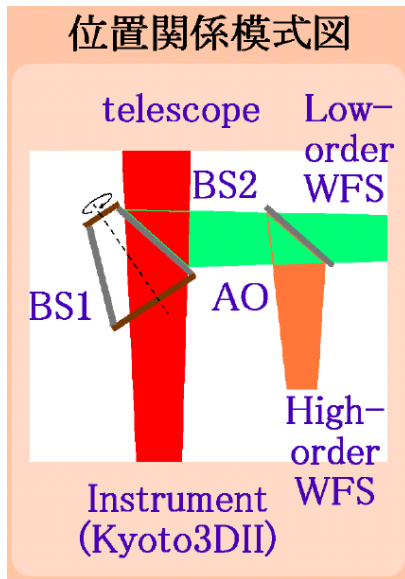
now in Hawaii



K3DII new Fixed Points



Optical interface (dichroic mirror: measured)



cf. Laser guide star 589nm.

AO low-order wave-front
sensor 450-1000nm.

Present status

- Mechanical interface

Nasmyth Mount

test done

Four fixed points

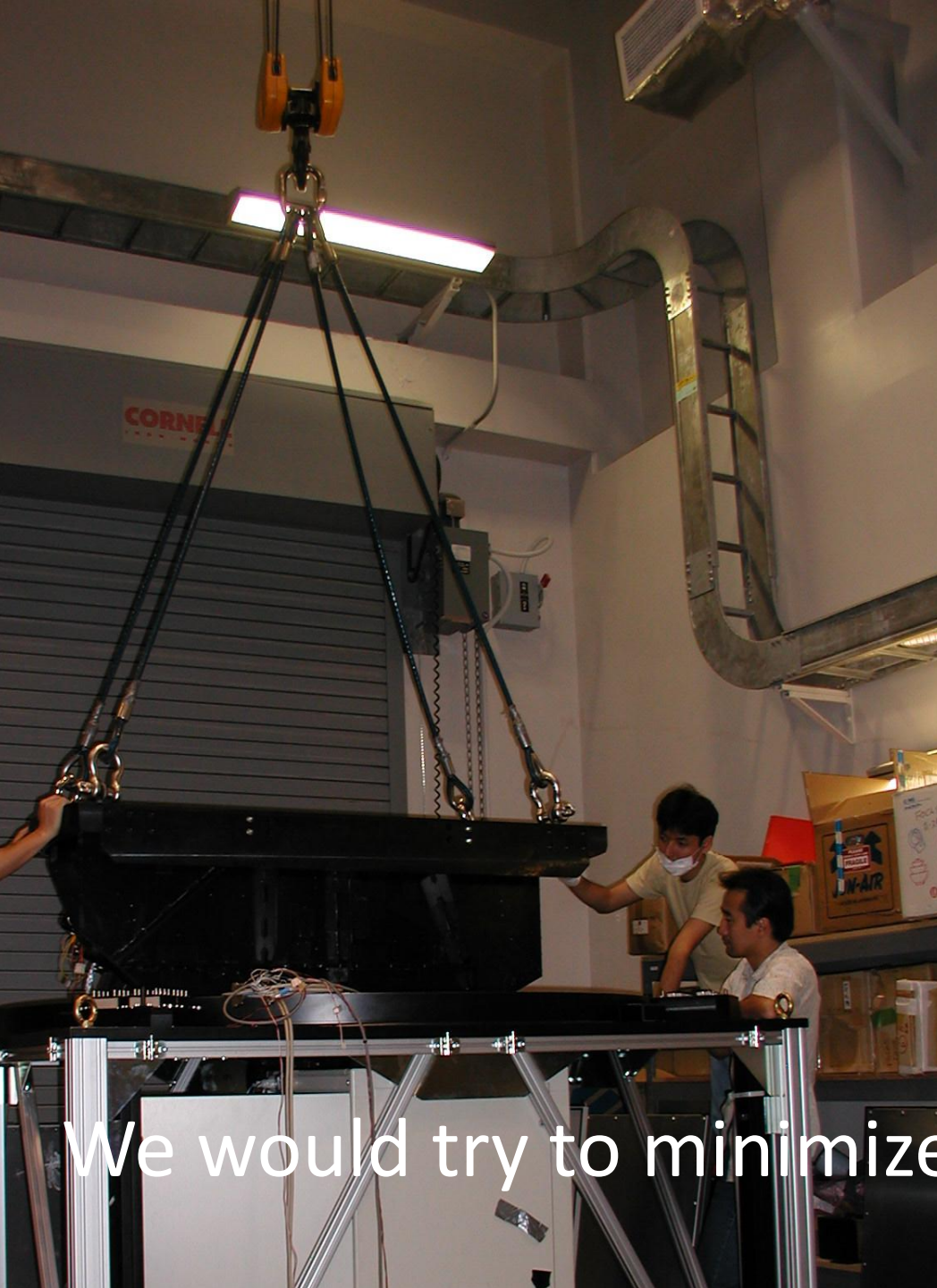
setting done

- Optical interface

dichroic mirror

installed on
2010 Apr 29,
with Minowa-san

Now we are waiting for AO188



h in future?

avelengths ($>650\text{nm}$)

lengths ($<650\text{nm}$)



We would try to minimize our changes of foci.

Proposed schedule

This must **not** damage AO188, IRCS, Hi-CIAO schedules.

This must **not** damage Hawaii observatory schedules, including daycrews' ones.

Proposed schedule

2011

Optical alignment between 3DII & AO188
(by using 3DII CCD & AO188 worked)

Software integration with AO188
through Gen2 (SOSS compatible)?

Test observations