

OAOWFC の現状報告

柳澤顕史 (OAO/NAOJ)

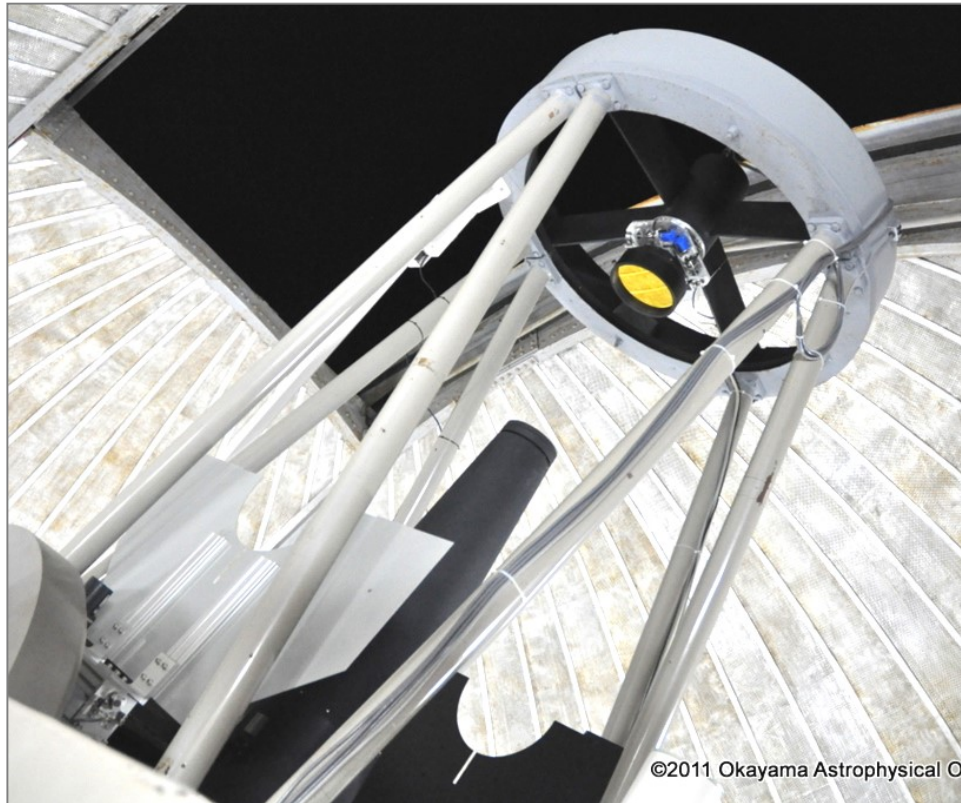
泉浦秀行、中田好一、清水康広、黒田
大介、筒井寛典、戸田博之、吉田道利、
太田耕司、河合誠之、山室智康

概要

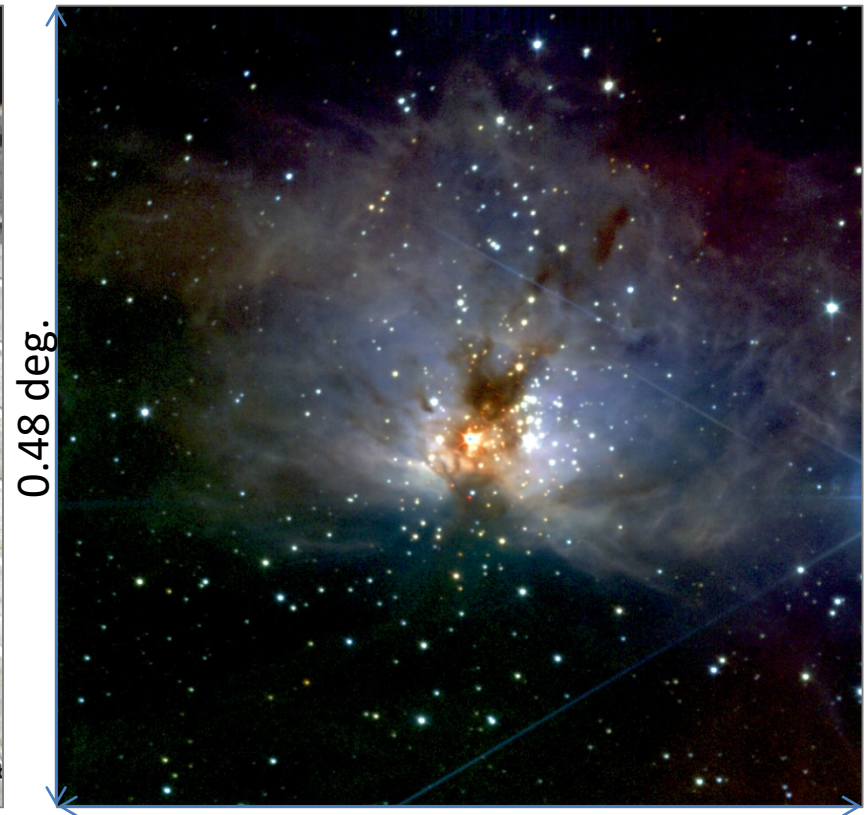
- OAOWFC
 - 30分角の視野をもつ $\phi 910\text{mm}$ の近赤外(Y,J,H,Ks)ロボットカメラ。
 - F/2.5 で近赤外では最も明るい光学系を持つ。
 - 昨年度、光学系の調整を完了した。
- 観測
 - 通常は K-band 銀河面モニタを実施し、Cepheid を探査中。腕の断面を見られる2天域をモニタ中。
 - 突発天体(重力波光学対応天体、GRB)のフォローアップを実施。GW151228などの観測を実施した。

OAOWFC

Okayama Astrophysical Observatory Wide Field Camera



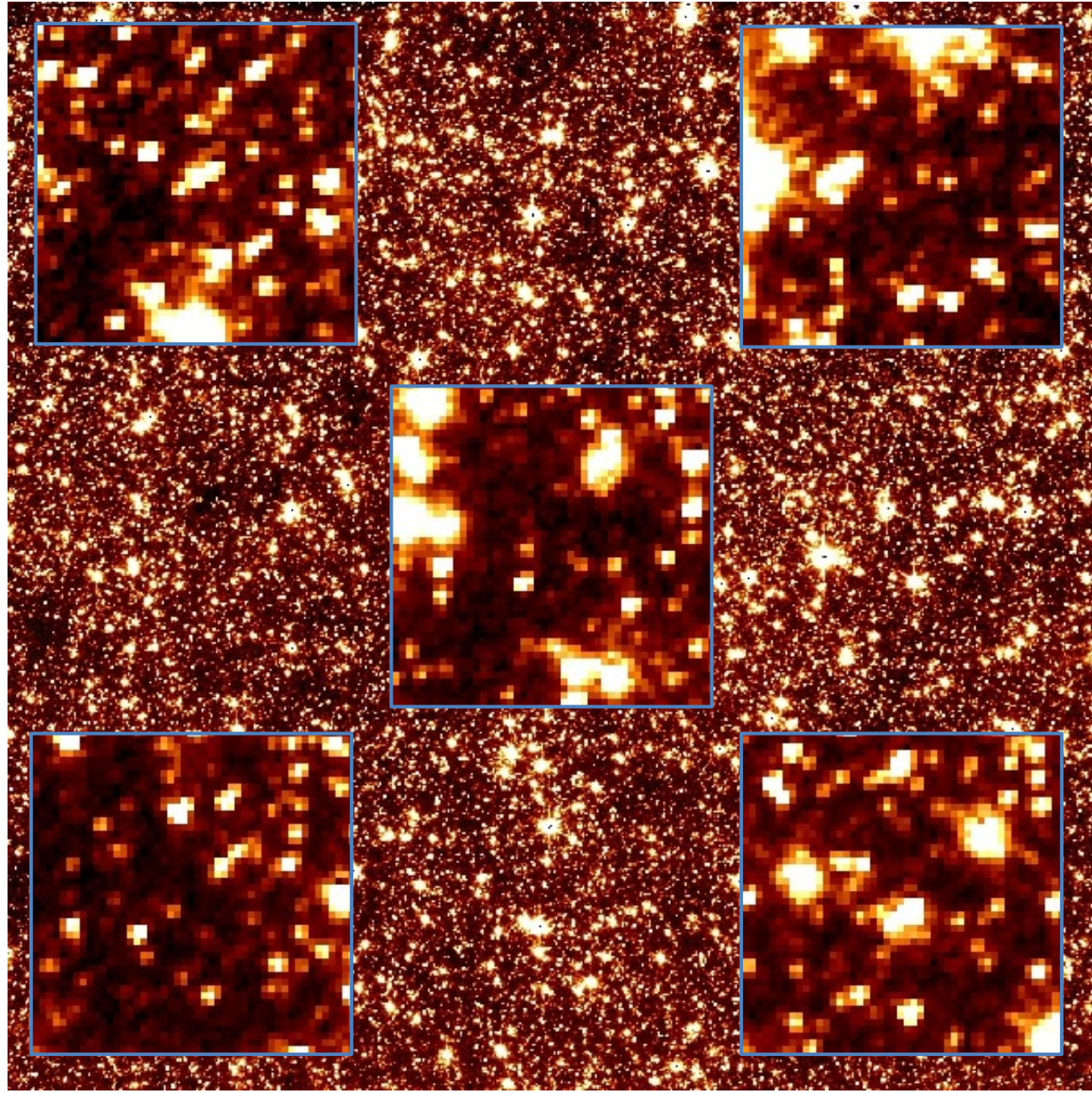
OAOWFC



0.48 deg.

光学調整の結果視野全域でシャープな画像が得られるようになった

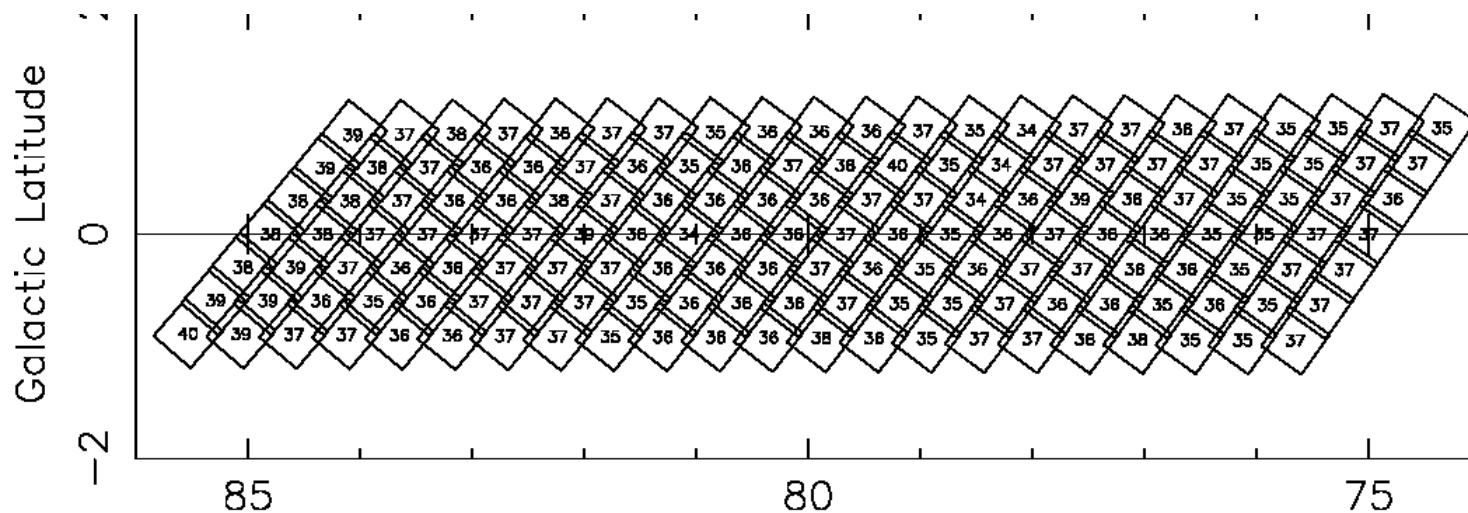
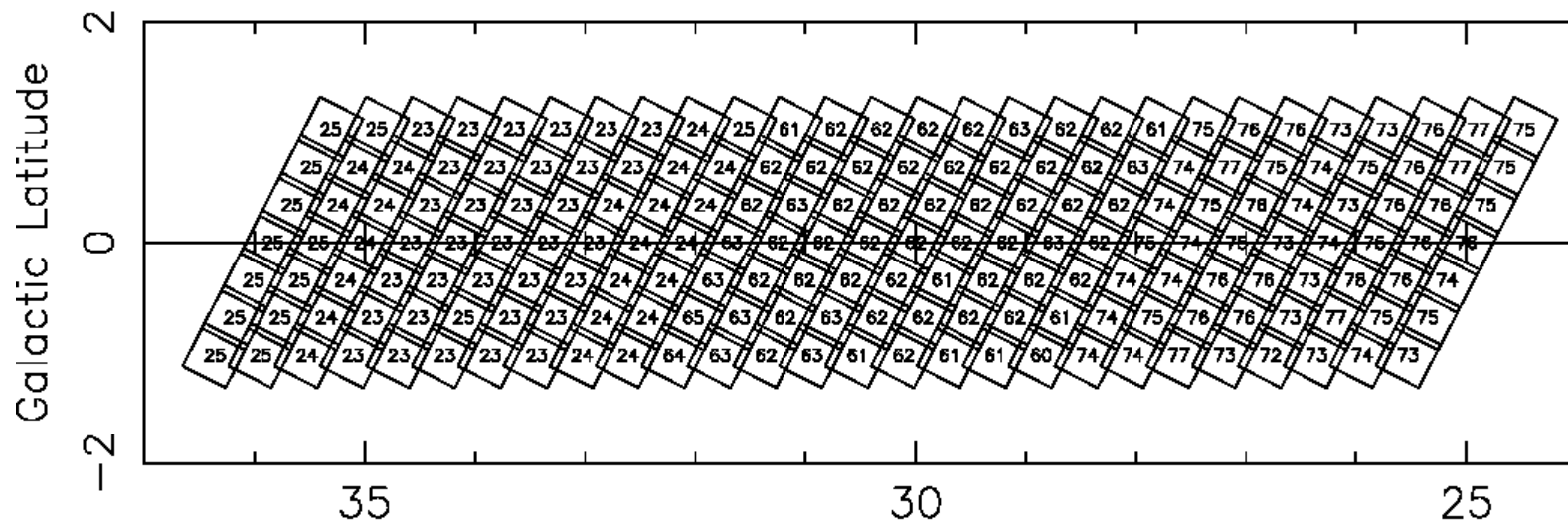
2016/9/7



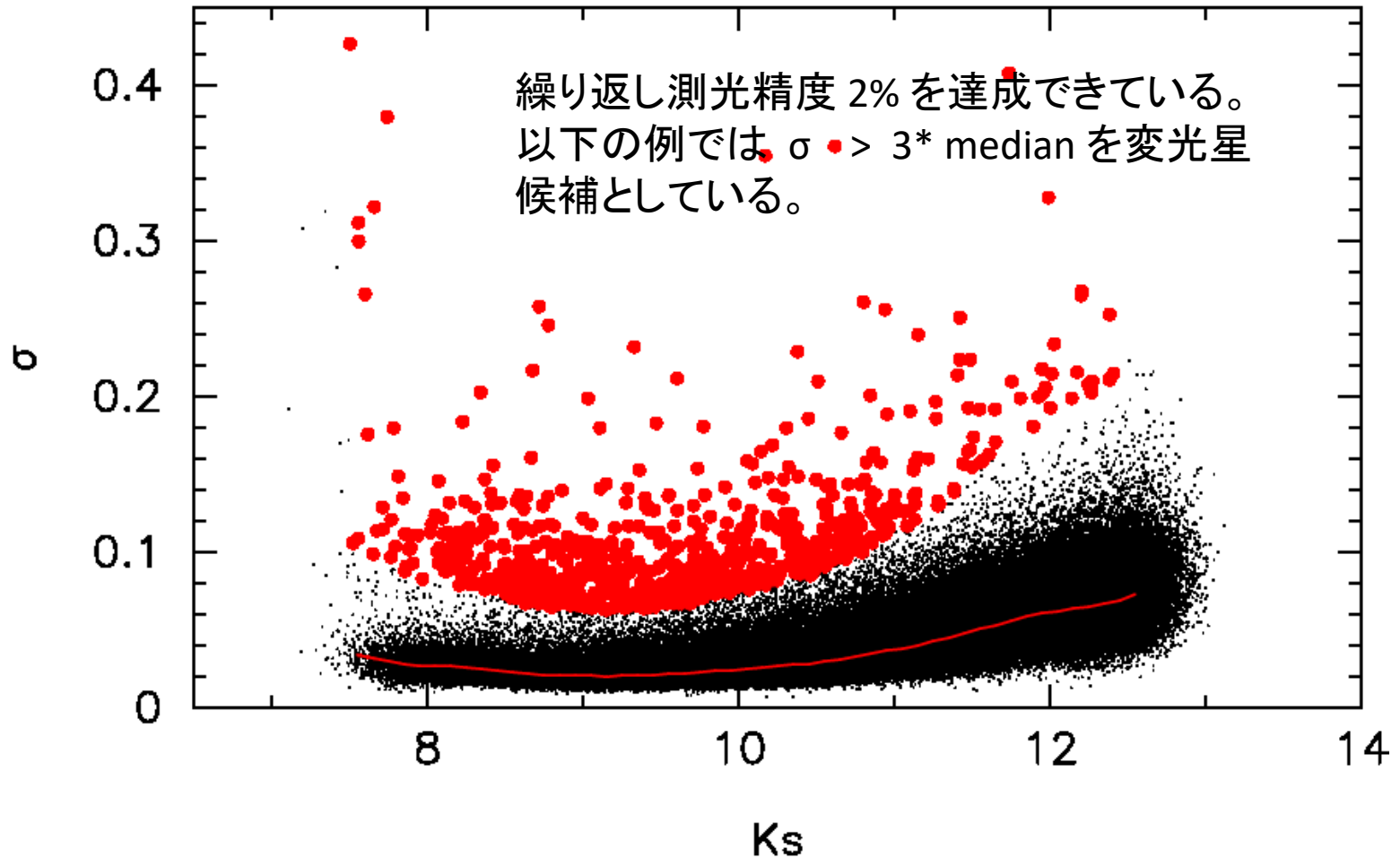
OAUM 2016

GP026_025_2015052617_141_coadd.fits 8 frames combined

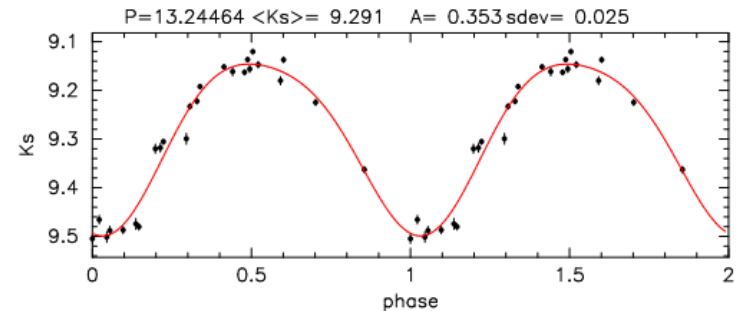
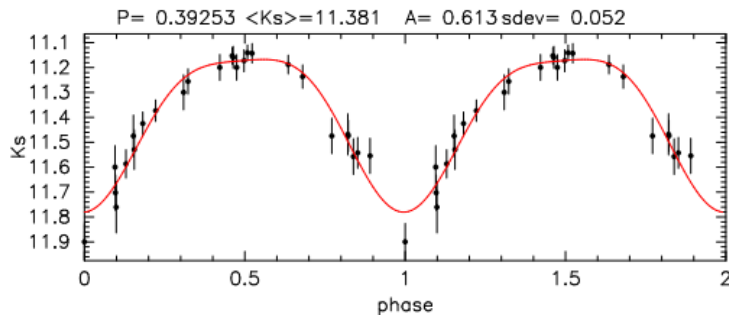
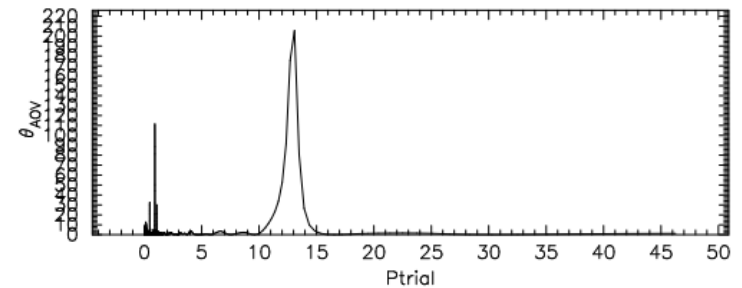
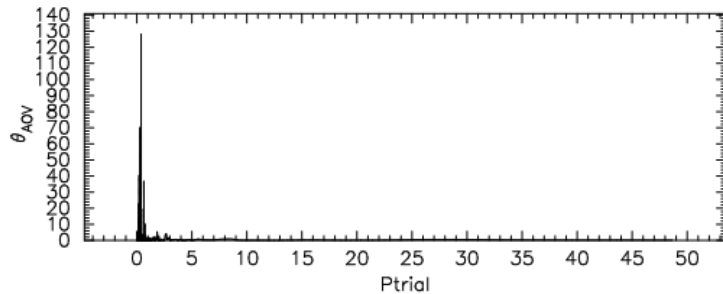
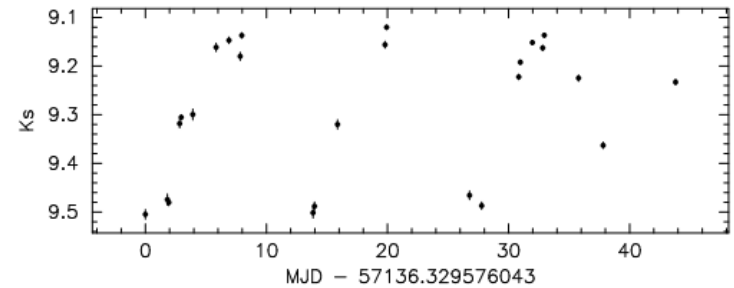
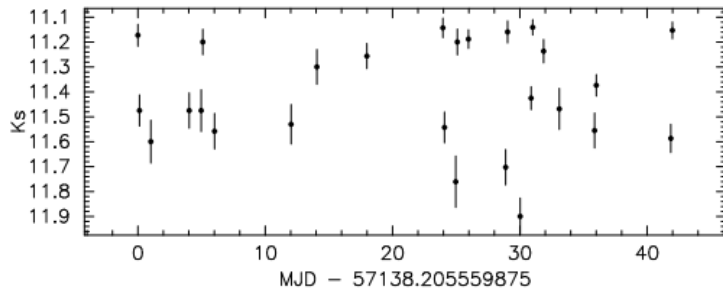
K-band 銀河面モニタ カバー天域とモニタ回数



K-band 銀河面モニタ・繰り返し測光精度と 変光星候補

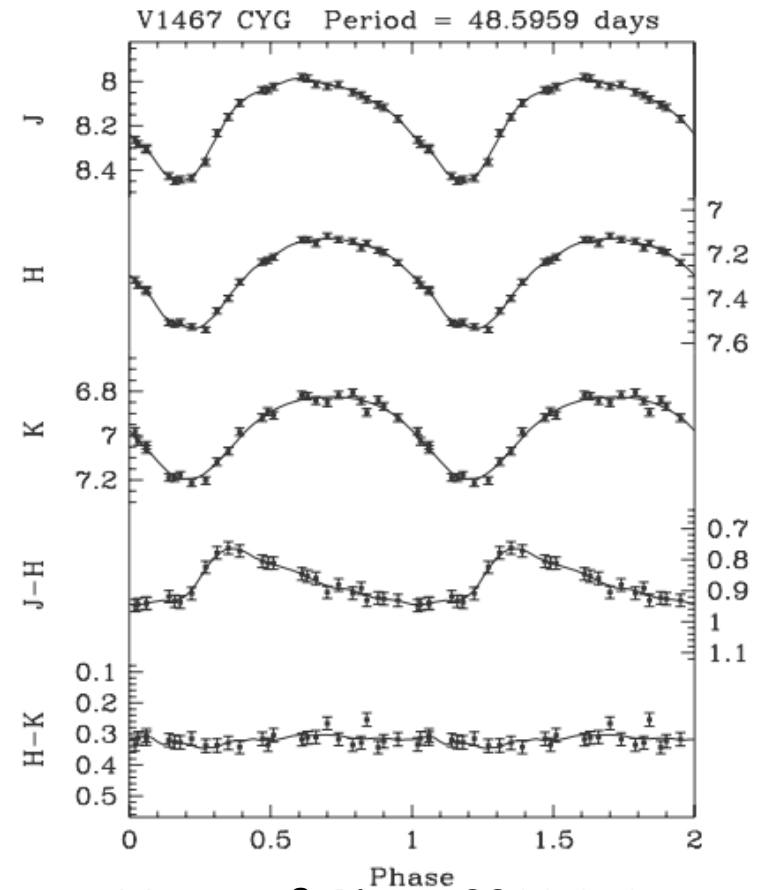


周期的変光星の解析例



Cepheid の距離算出

- 観測データと、2MASS PSC を使用
- $K - M_K - A_K = 5 \log D - 5$
 - K: 平均等級 (観測から求める)
 - M_K : 絶対等級 (観測から求める)
 - A_K : 星間吸収 (2MASS から求める)
 - D: 距離
- A_K の算出
 - $A_K = 1.67 E(H-K)$
 - Cepheid の H-K 位相を通じて一定
 - Laney & Stobie (1992), Dekany+ (2014)
 - $E(H-K) = (H_{2MASS} - K_{2MASS}) - (M_H(P) - M_K(P))$
 - $M_X(P)$ は X-band の周期X等級関係



Monson & Pierce 2011 ApJ

重力波光学対応天体のフォローアップ観測

- 観測方法
 - 近傍銀河をターゲットとしたフォローアップ
 - 各フィールドごとに J-band, 15^{min} 露出
- 2MASSと同じ観測限界に到達
 - $J=17-18^{\text{mag}}$ ($S/N=3$)
- 対応天体の搜索
 - 画像を並べて目視確認
 - 画像差し引きによる差分画像により、より確実な搜索を実施

フォローアップ観測報告

TITLE: GCN CIRCULAR
 NUMBER: 18774
 SUBJECT: LIGO/Virgo G211117: OAO-WFC NIR follow-up observations
 DATE: 15/12/30 14:31:26 GMT
 FROM: Michitoshi Yoshida at J-GEM <yoshidam@hiroshima-u.ac.jp>

K. Yanagisawa, D. Kuroda (OAO/NAOJ), K. Ohta(Kyoto), N. Kawai(Tokyo Tech.) and M. Yoshida (Hiroshima) on behalf of the J-GEM collaboration

We carried out J-band imaging observations of 66 nearby galaxies to search for new point sources associated with the objects, in response to G211117.

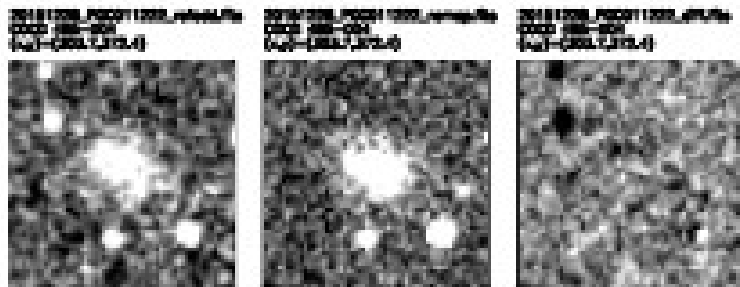
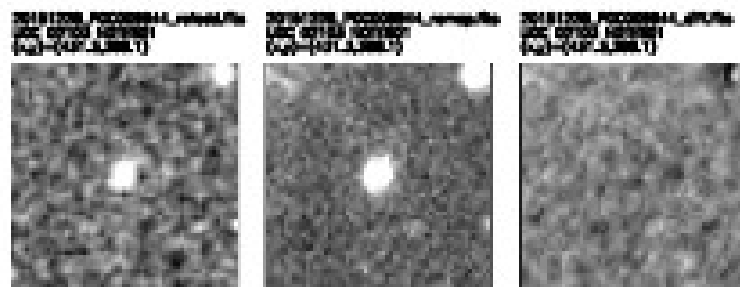
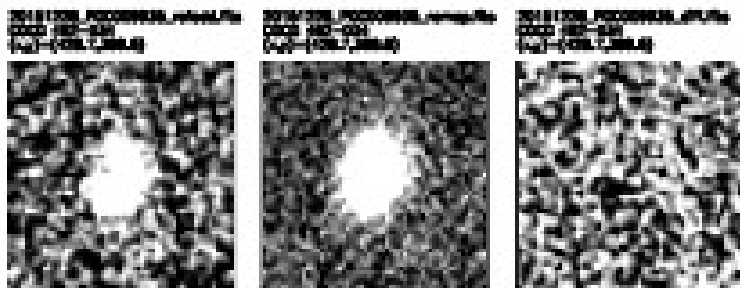
The observations were made on 28th and 29th December 2015, with a wide-field infrared camera (D=0.91 m), OAO-WFC, of Okayama Astrophysical Observatory (Japan).

We could find no new point sources brighter than the limiting magnitude of J=17-18(S/N=3) in Vega system. The photometric calibration was made against 2MASS field stars.

```
#-----
#Time(UT) exposure[sec] ra[deg.] width[arcmin] dec[deg.]
#width[arcmin] J-Upperlimit(3-sigma) Object
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2015-12-28T09:10:19.131 900 29.2078 4.0 4.0256 4.0 17.8 UGC01424
2015-12-28T09:30:41.517 900 29.3356 4.0 4.3485 4.0 17.8 PGC007354
2015-12-28T09:51:03.997 900 29.8521 4.0 5.5928 4.0 17.9 PGC1285927
2015-12-28T10:11:16.345 900 31.1301 4.0 6.6357 4.0 18.0 PGC3091794
2015-12-28T10:31:28.310 900 33.0117 4.0 9.5161 4.0 17.9 UGC01694
2015-12-28T10:51:47.454 900 33.4026 4.0 10.3363 4.0 18.0 UGC01714
2015-12-28T11:12:02.227 900 34.4222 4.0 12.4706 4.0 18.0 IC1791
2015-12-28T11:32:13.798 900 34.5632 4.0 13.2044 4.0 18.2 UGC01773
2015-12-28T11:52:30.558 900 35.5554 4.0 12.0300 4.0 18.2 UGC01834
2015-12-28T12:12:45.699 900 37.1137 4.0 15.6071 4.0 18.3 UGC01946
2015-12-28T12:33:12.572 900 39.3358 4.0 20.4153 4.0 18.2 PGC009935
2015-12-28T12:53:45.424 900 39.3678 4.0 21.1420 4.0 18.3 PGC009944
2015-12-28T13:13:53.799 900 39.7754 4.0 18.3839 4.0 18.3 UGC02140
2015-12-28T13:34:15.913 900 40.8671 4.0 20.5960 4.0 18.3 PGC2807171
2015-12-28T13:54:34.347 900 42.2875 4.0 23.0175 4.0 18.3 UGC02290
2015-12-28T14:14:47.967 900 42.7106 4.0 22.7720 4.0 18.3 PGC010806
2015-12-28T14:34:57.807 900 43.2791 4.0 25.4904 4.0 18.2 IC1861
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2015-12-28T15:56:23.389 900 55.6185 4.0 38.9676 4.0 18.1 PGC013618
2015-12-28T16:16:33.489 900 55.9870 4.0 39.2952 4.0 18.0 UGC02836
2015-12-28T16:36:42.387 900 56.9158 4.0 39.3469 4.0 17.9 UGC02861
2015-12-28T16:56:57.534 900 57.0385 4.0 37.4571 4.0 17.8 PGC165376
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2015-12-28T17:37:34.003 900 58.2341 4.0 40.1128 4.0 17.8 PGC097023
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2015-12-28T19:20:20.267 900 197.5713 4.0 -7.4543 4.0 17.4 PGC045697
2015-12-28T19:40:34.433 900 197.6181 4.0 -7.6504 4.0 17.8 PGC045726
2015-12-28T20:00:59.196 900 197.8193 4.0 -7.2722 4.0 16.9 PGC1021744
2015-12-28T20:21:16.212 900 194.2792 4.0 -0.8078 4.0 18.2 PGC1134210
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2015-12-29T10:19:30.971 900 27.5294 4.0 -0.7401 4.0 18.5 UGC01296
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2015-12-29T15:26:56.055 900 103.1141 4.0 57.1628 4.0 18.2 UGC03569
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2015-12-29T17:29:55.263 900 194.3536 4.0 -0.6225 4.0 18.7 PGC044291
2015-12-29T17:50:12.111 900 195.1905 4.0 -2.7181 4.0 17.8 PGC1084547
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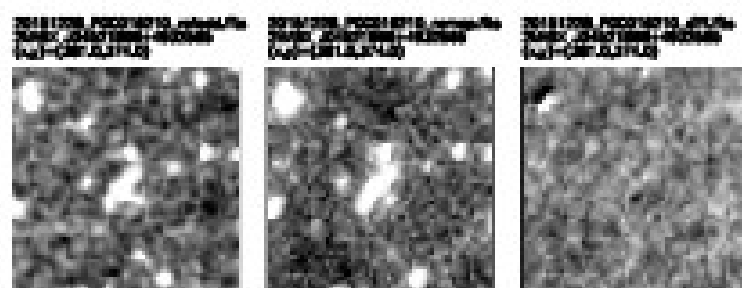
光学対応天体搜索のために用意した差分 画像の例



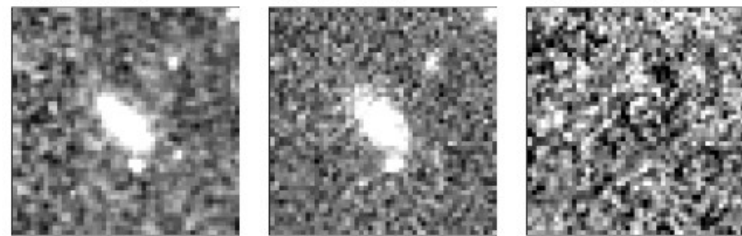
2MASS

OAOWFC

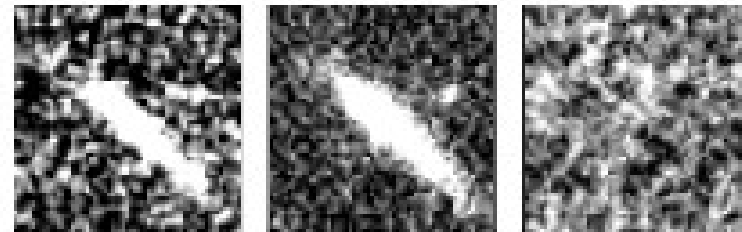
Difference



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20151228_PGC011222_refadd.fits
CGCG 485-002B
(x,y)=(458.7,319.7)



2MASS

OAOWFC

Difference