AROMA

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Agenda

- AROMA
- AROMA-W
- Real-time analysis of AROMA-W
- Future plan
- Conclusion

- AROMA

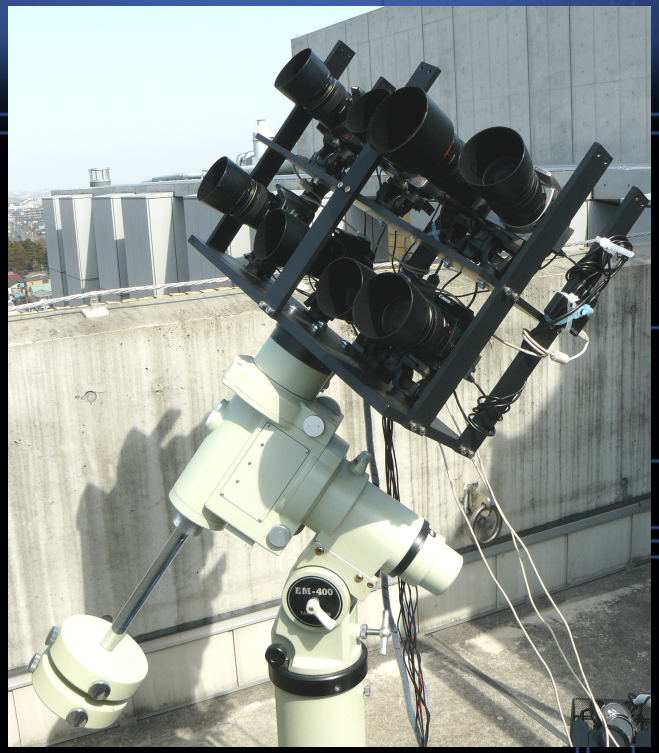
AGU Robotic Optical Monitor for Astronomical objects

Two kinds of remote observation instruments

Follow-up 30 cm telescope
AROMA-N (Narrow)

Wide-field monitor
AROMA-W

AROMA-W (AROMA - Wide field)



- Wide-field monitor using multiple DSRLs
- Observed objects :
  - ✓ GRB optical emission
  - ✓ Variable stars
  - ✓ SNe, Novae
  - ✓ Comets
  - ✓ Meteors

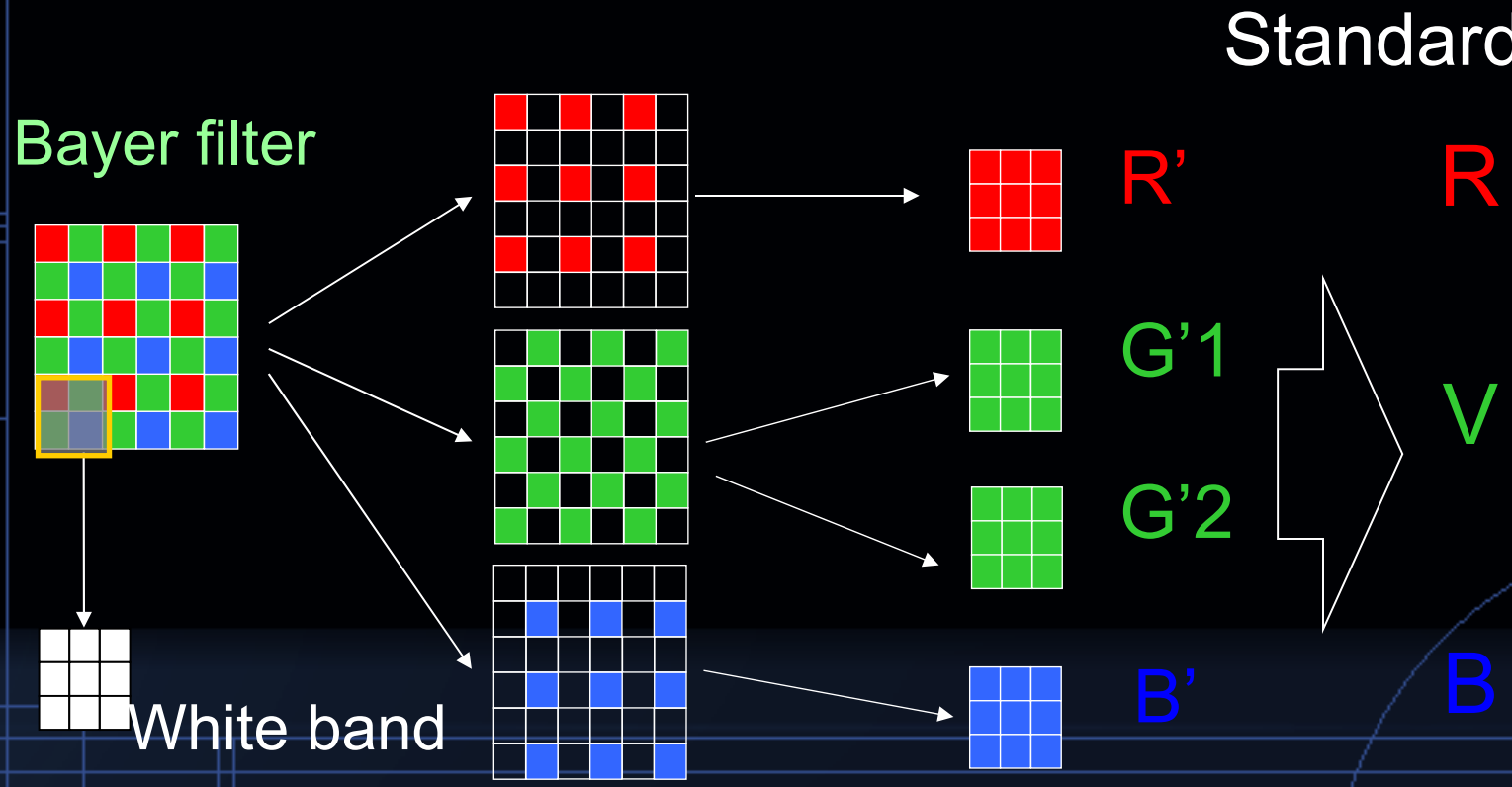
  etc.
- It is possible to observe by eight cameras now.

CANON EOS 5D
+ EF200mm F2.8USM
×1

CANON EOS 350D (EOS Rebel)
+ EF100mm F2.0USM
×7

Tri-color imaging and photometry

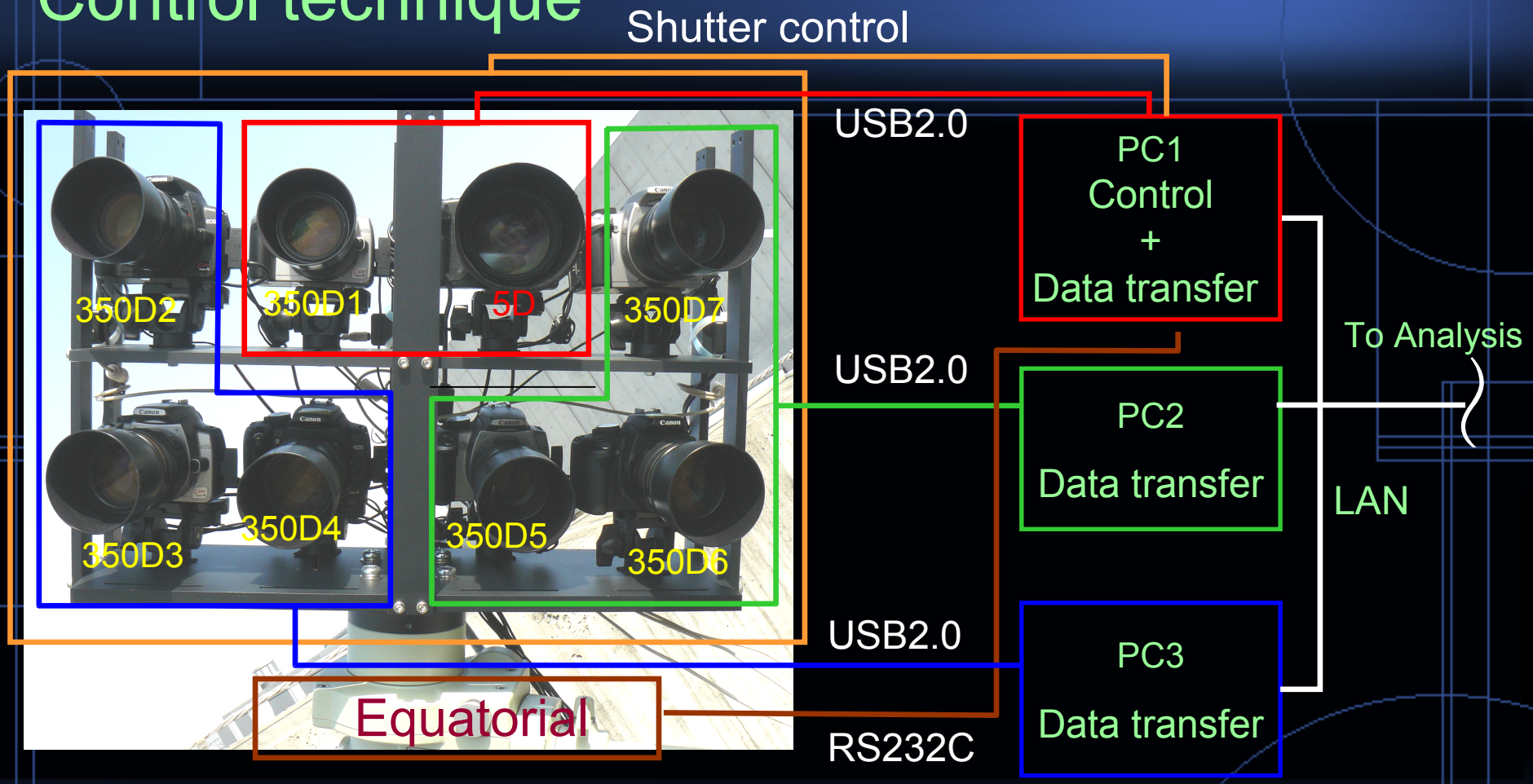
Tri-color resolution



AROMA-W Hardware Performance

- Control technique
- Field of view
- Limiting magnitude

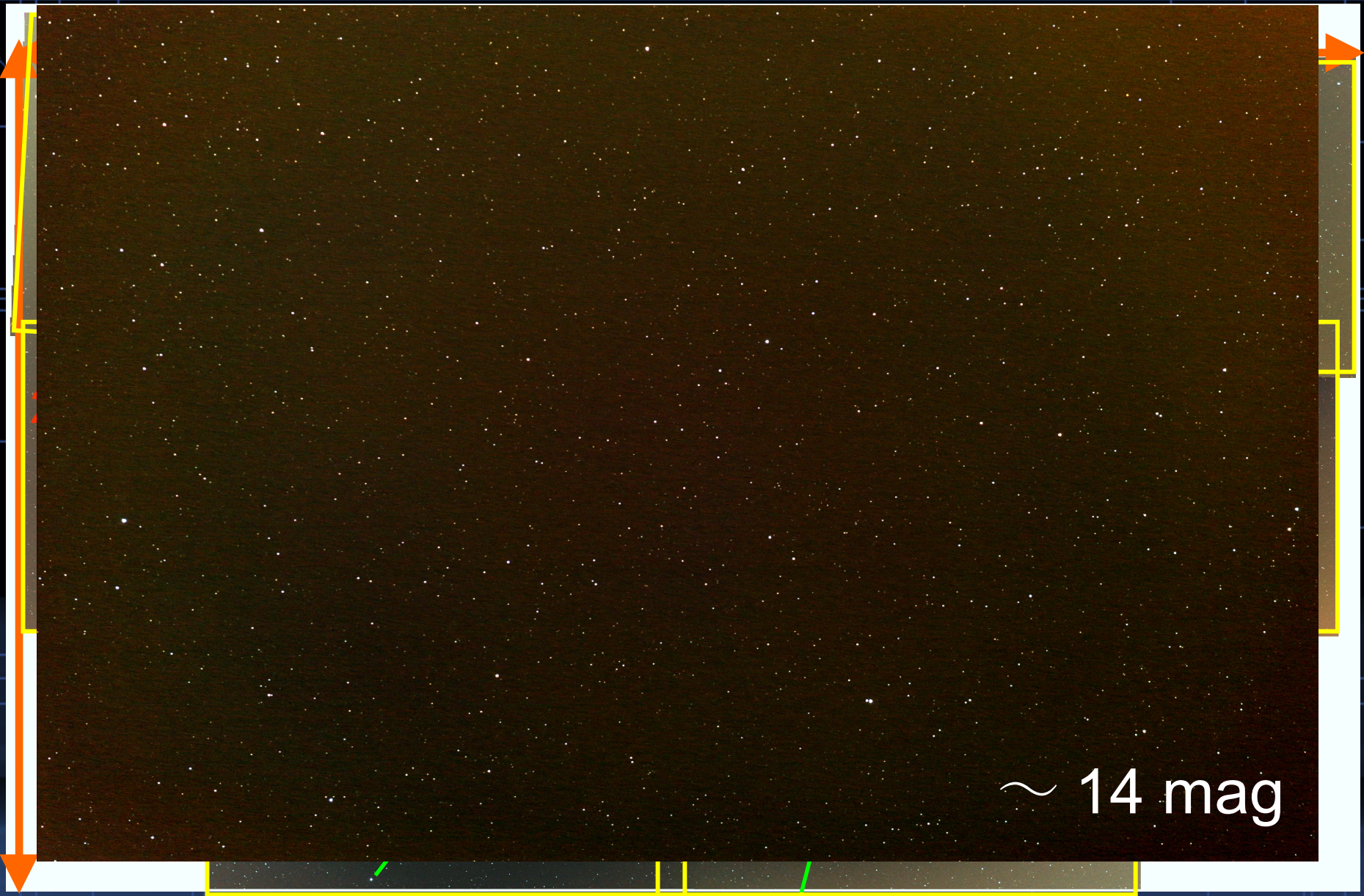
Control technique



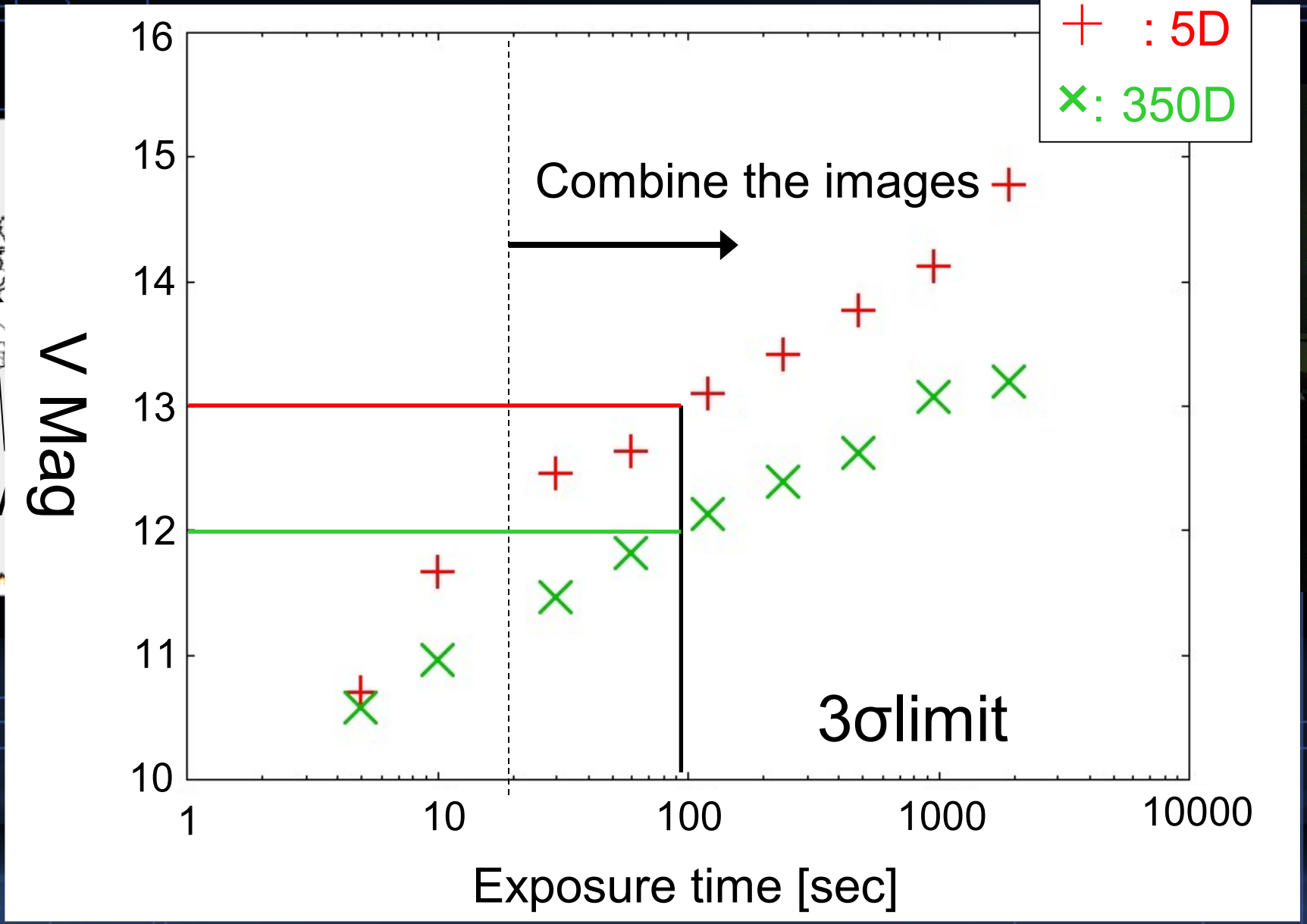
- There are 3 PCs for control and data taking
- Each PC gets data from 2 or 3 cameras
- The acquired data are sent to analysis PC frame by frame

Field of view of AROMA-W

- A mosaic of the FOV of each camera



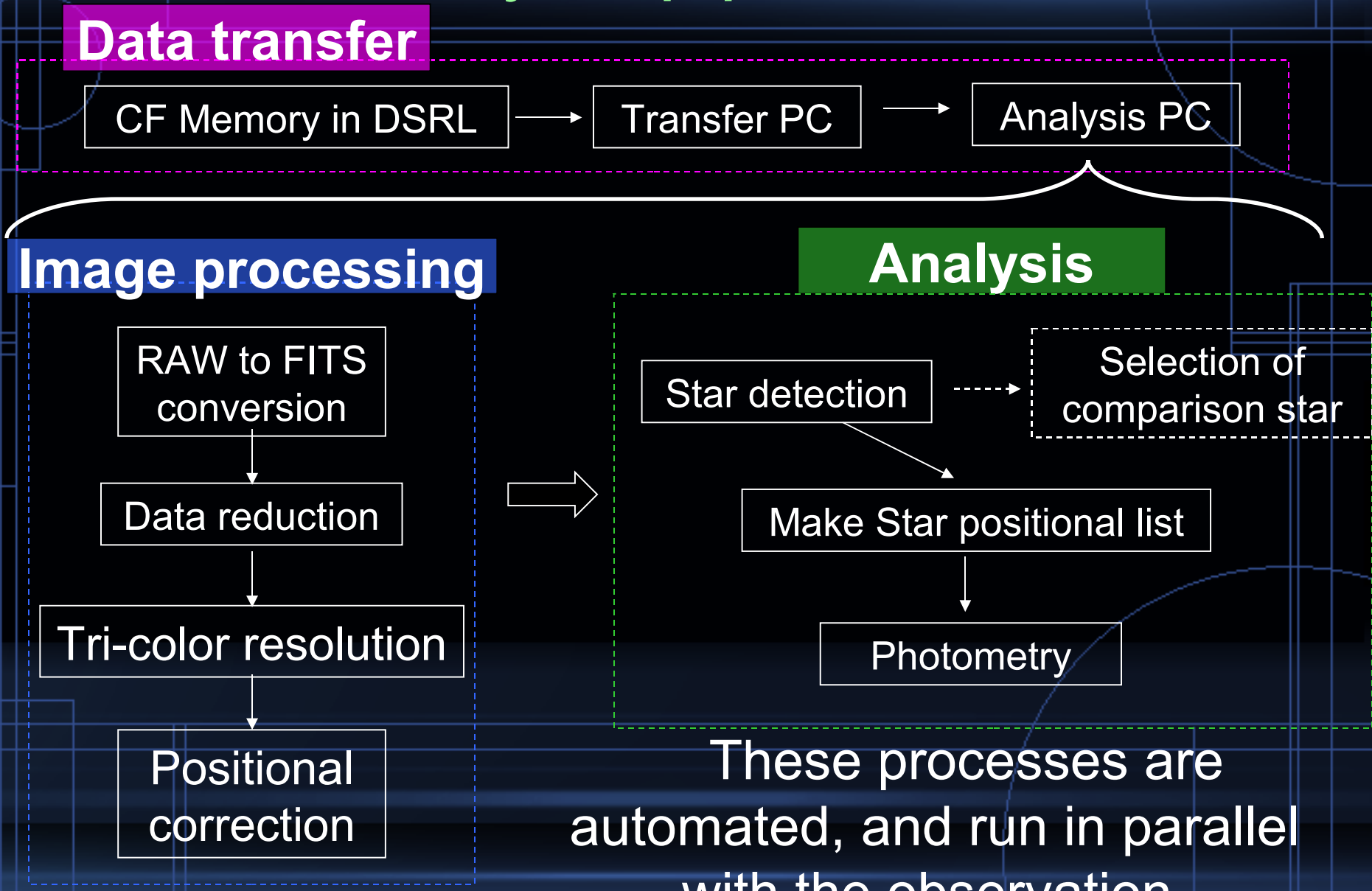
Limiting Magnitude



Real-time analysis of AROMA-W

- Analysis pipeline
- How to search OT
- How to search variable star
- Examples of detected

Analysis pipeline



These processes are automated, and run in parallel with the observation.

How to search OT

Analysis

Star detection

Selection of comparison star

Making of star positional list

Photometry

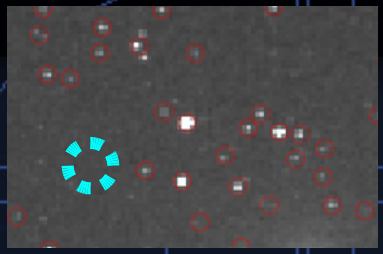
Current list

New list

comparing

Search Brightening OTs

Photometry based on the list

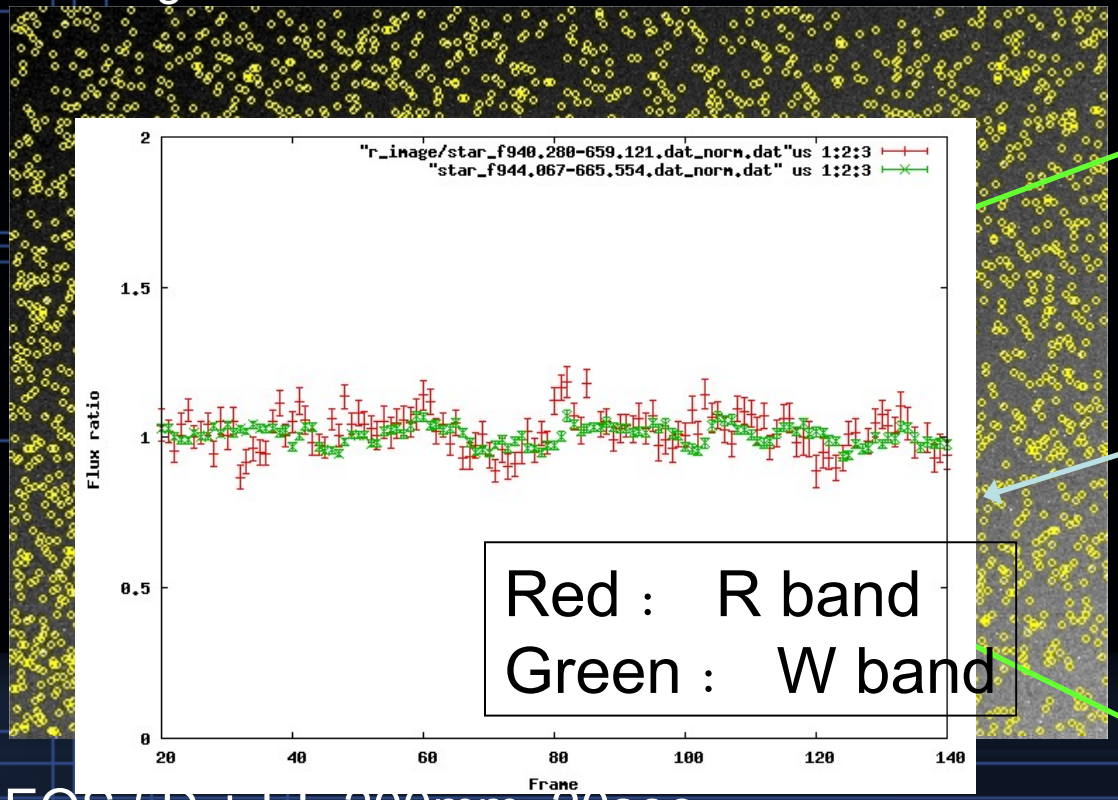


Seach fading stars

How to search variable star

AROMA-W monitor the luminosities of all the objects in the F.O.V.

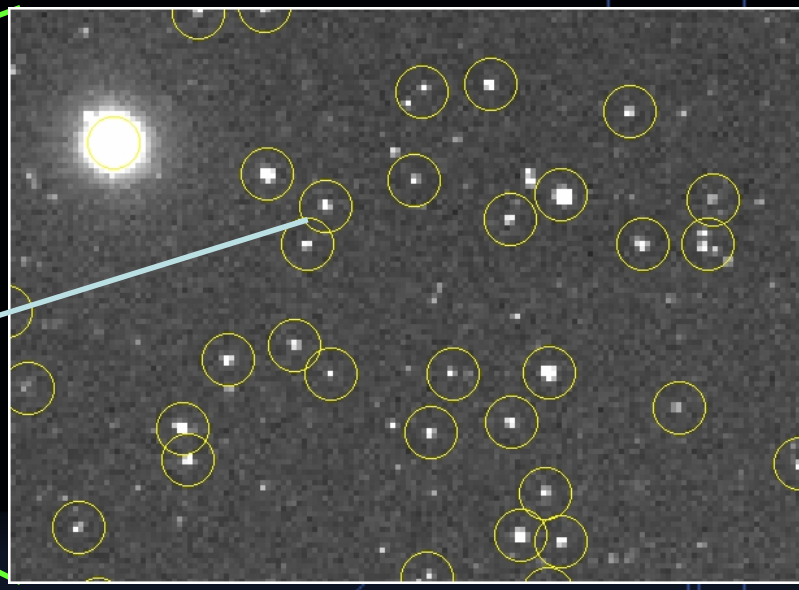
5D image



EOS 5D + EF 200mm 20sec

Threshold : 1.5σ 4 pixels over

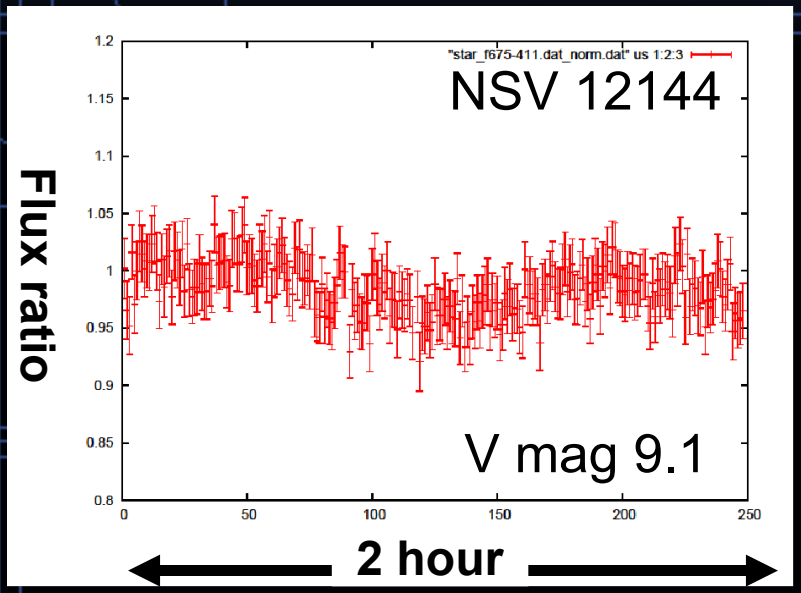
～ 5000 objects

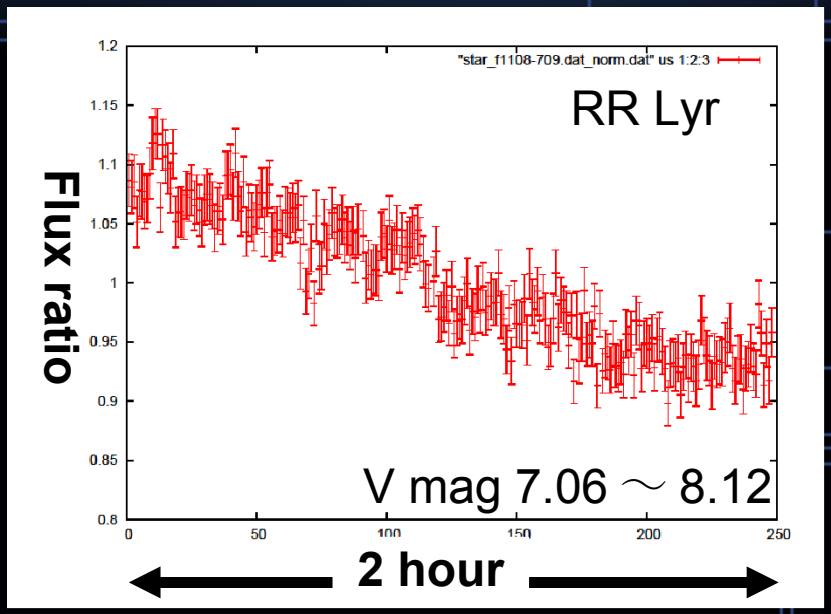


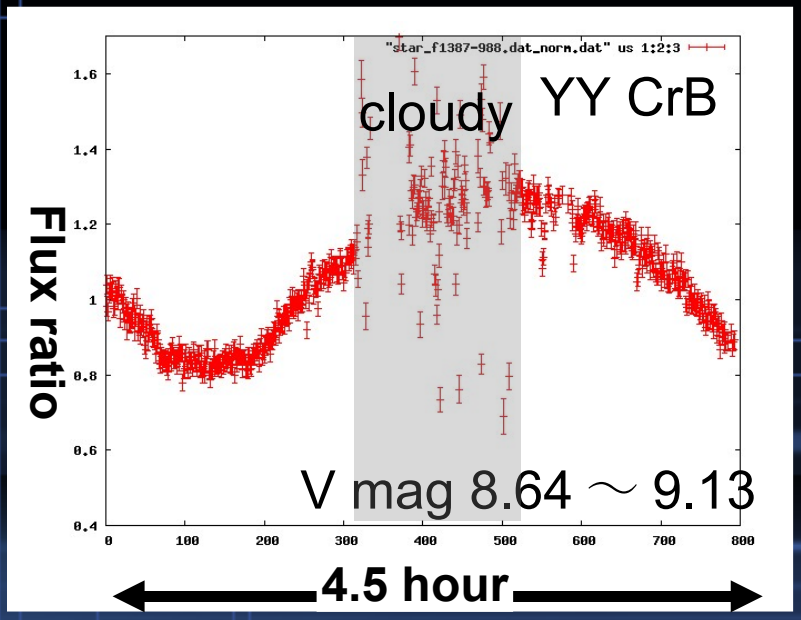
By monitoring these light curves

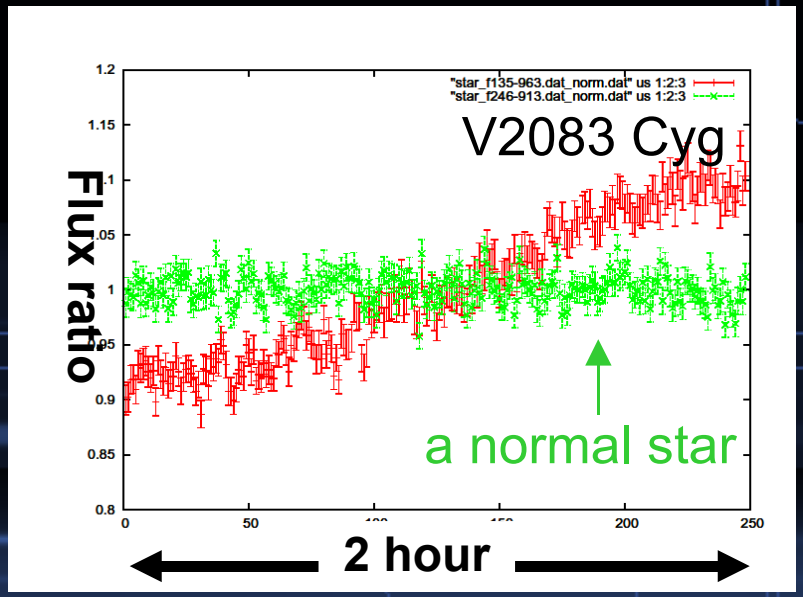
Search variable stars

Examples of variable stars which ware detected









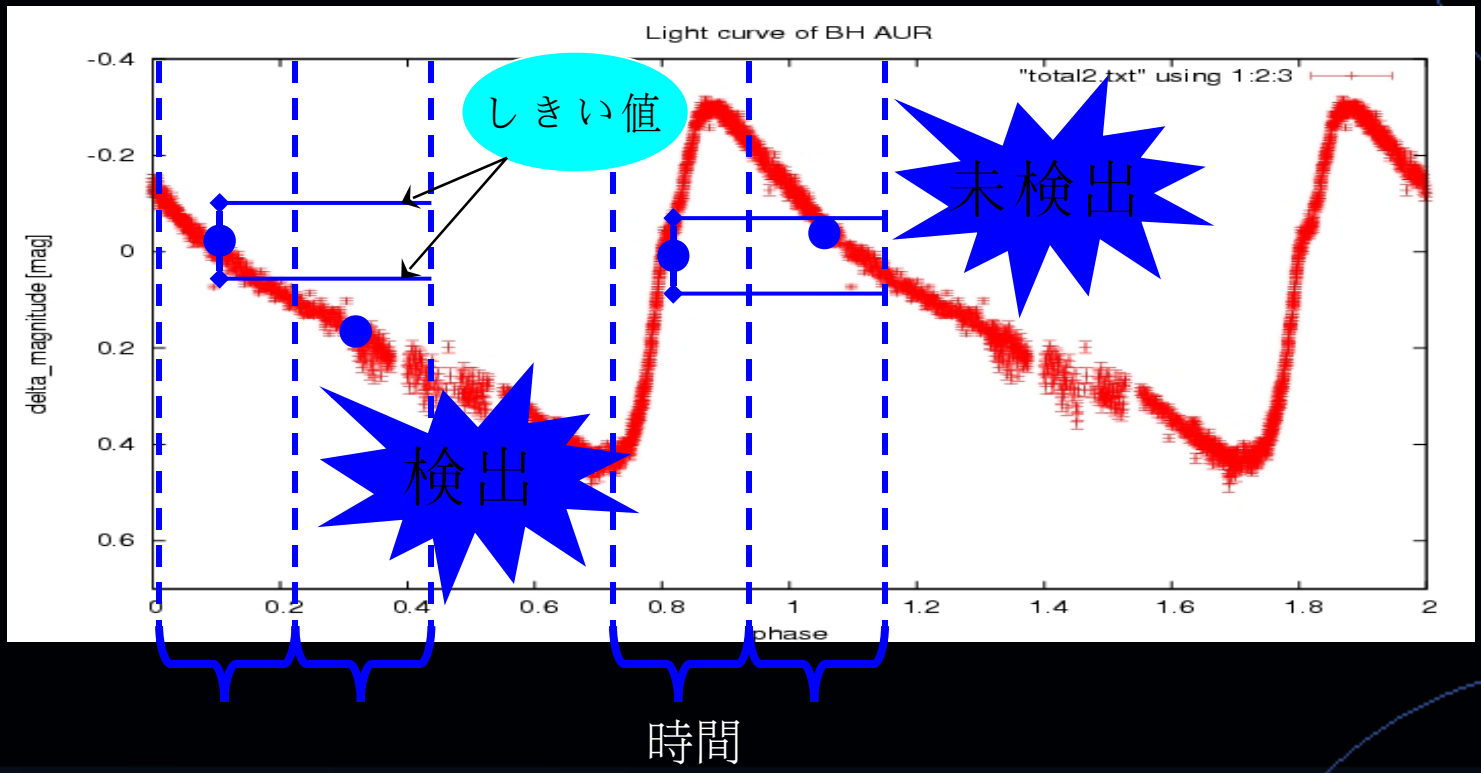
Future plan

- Staring main observation of AROMA-W
- Improvement automatic analysis system
- Making of data archive
- Start up the AROMA website
- Coordinated observation of AROMA-N and AROMA-W

Conclusion

- AROMA is Robotic Optical Monitor system
- AROMA-W is a wide-field observation monitor using multiple DSRLs
  - F.O.V. : ～35°× 25°
  - Limiting mag : 12～13 mag （100sec, 3σ）
- Real-time analysis algorithm is being developed
- AROMA-W monitor the luminosities of all the objects in the F.O.V.
- We succeeded in detection of many variable stars

変光星の検出 (2)



- 一定フレーム数ごとに Flux 比の加重平均を計算
- 基準フレーム範囲における標準偏差からしきい値を決定
- 決定したしきい値を基に変光を判断する