Solar Physics Research in KAO

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Outline

- Introduction
- 20cm Refractor
- Solar Flare Telescope
- Spectroscopic System
- Future Plans
- Research Activities
- Personal Interests

Introduction

- **Korea Astronomy Observatory (KAO) is the leading institute for solar physics research in Korea**
- **KAO has 3 facilities for solar research**
  - **20cm refractor (since 1977)**
  - **SOlar Flare Telescope (SOFT, since 1995)**
  - **Spectroscopic system (since 2002)**

20cm Refractor

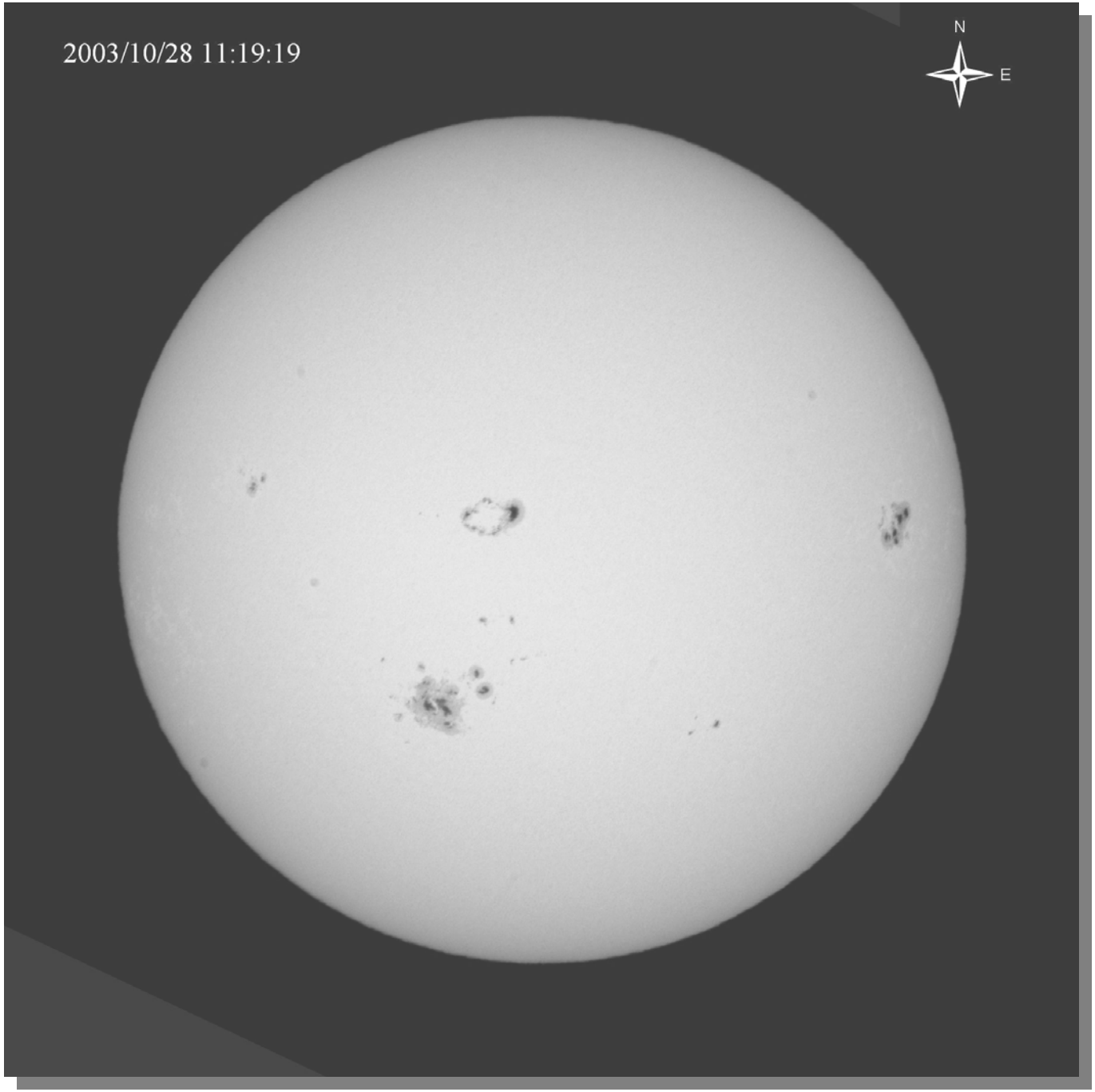
Main telescope

- **20cm aperture, F20**

Daily observation

- **Full-disk W/L image**
- **Sunspot number**

➡ **Solar cycle monitoring**


2003/10/28 11:19:19
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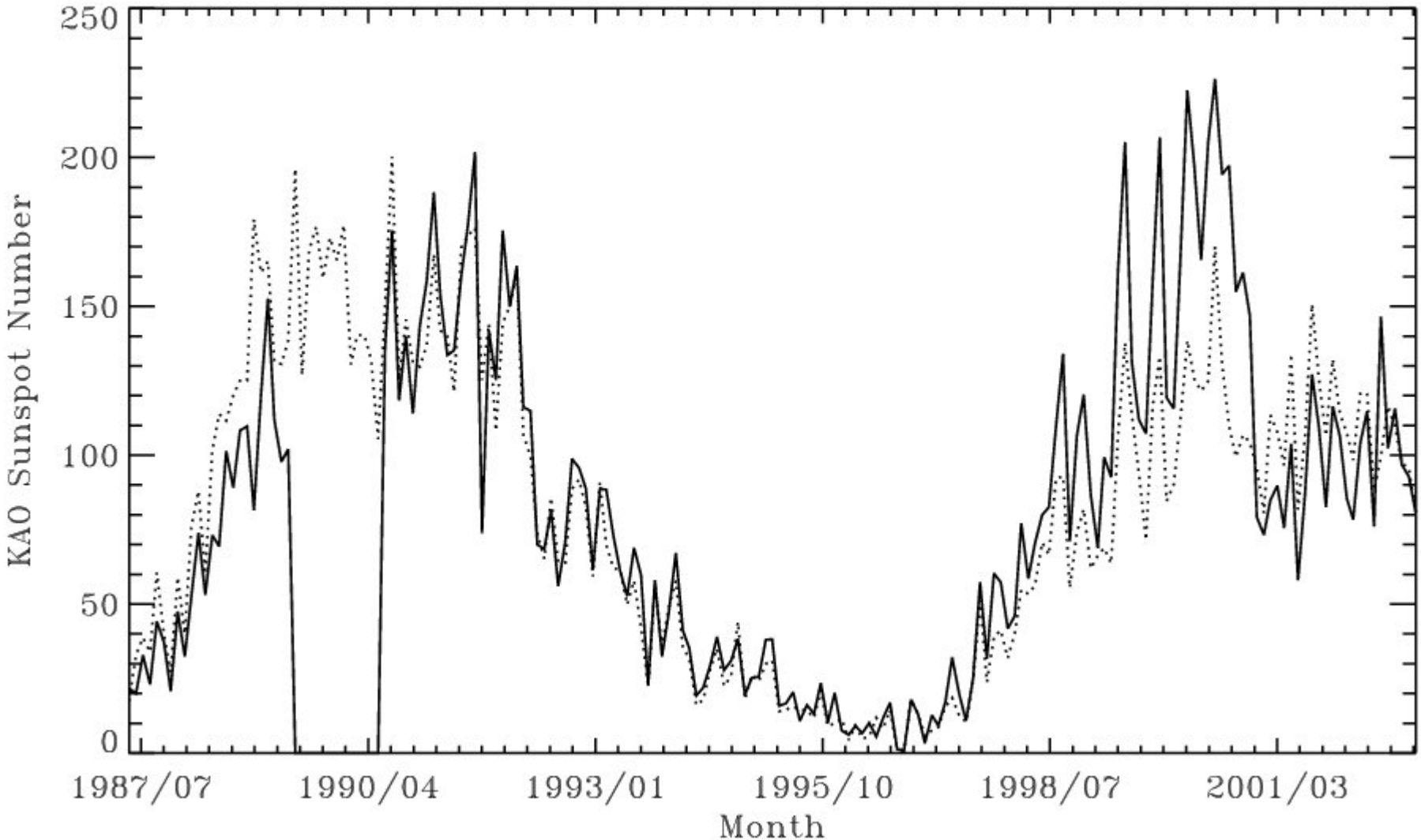

250
200
150
100
50
0
KA0 Sunspot Number
1987/07
1990/04
1993/01
1995/10
1998/07
2001/03
Month

Solar Flare Telescope (SOFT)

❑ 4-channel telescope

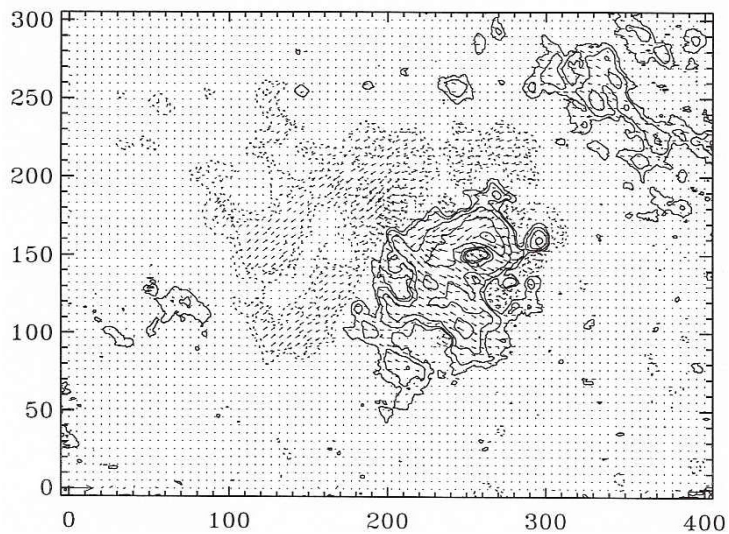
Objective Lens : 200mm(f/8)x2, 150mm(f/15)x2
Field of view 400'' by 300''

1) **White light**
Photospheric motions of active regions
2) **H alpha (6562.8 Å, Lyot filter FWHM = 0.25Å)**
Chromospheric activities
3) **VMG (6302.5 Å, Lyot filter FWHM = 0.125Å)**
Vector magnetic field
4) **LMG (6336.8 Å, Lyot filter FWHM = 0.2Å)**
Doppler velocity and longitudinal magnetic field

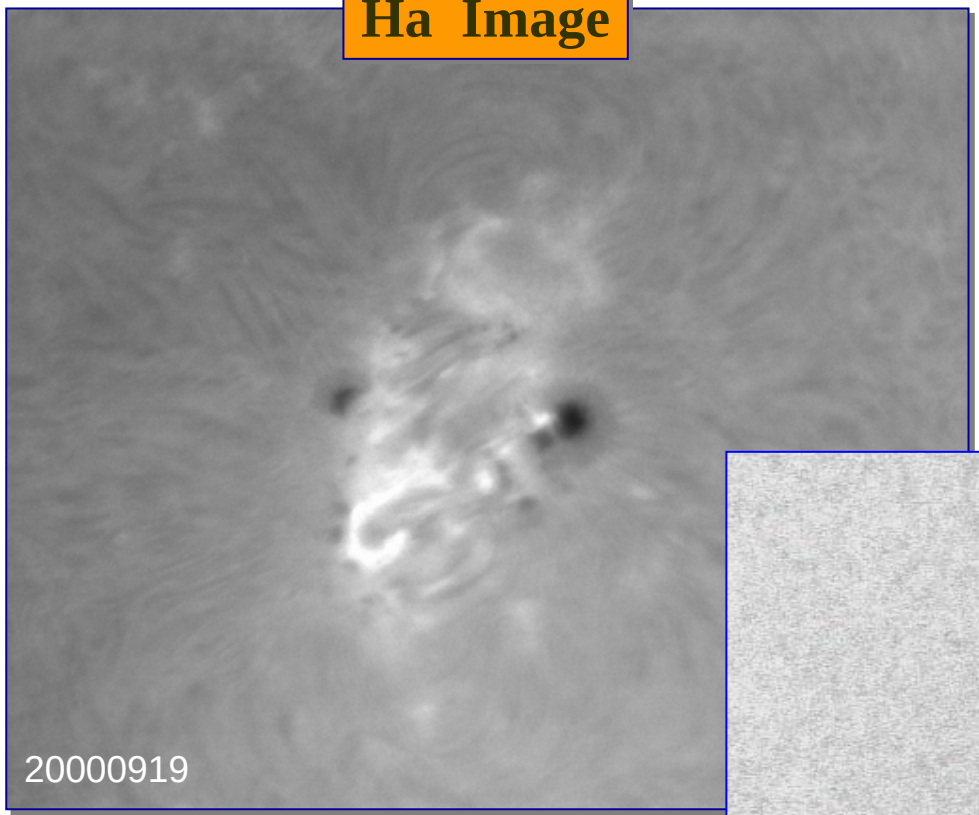
➡ **Understanding of solar activities such as solar flares and filament eruptions**

SOFT Vector Magnetogram (BOAO/KAO)

Date : 1998/11/05
Time : 05:29:38 UT
Data : 98041_1105001.fit
Xc,Yc : (228,215) arcsec
NS,EW : (18,10) deg
P : 23.78 deg
Bo : 3.956 deg
Rs : 965 arcsec
NOAA # : 8375
BOAO # : 041
Field : 400arcsec x 300arcsec

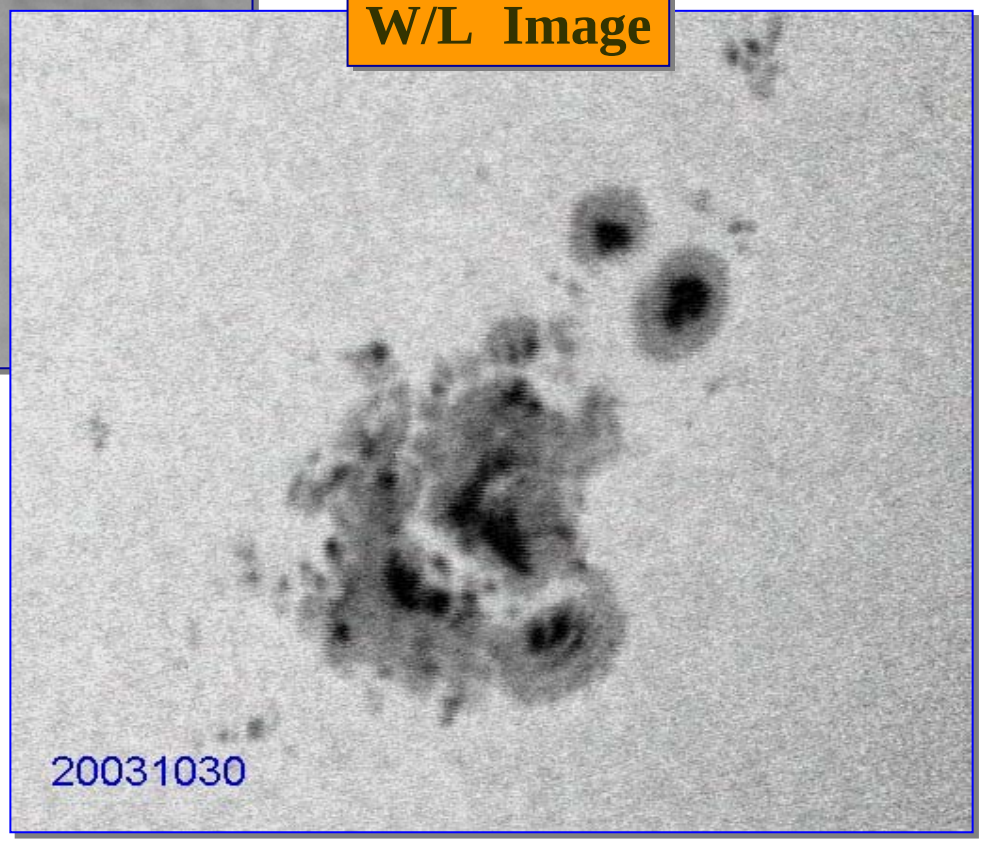


Ha Image

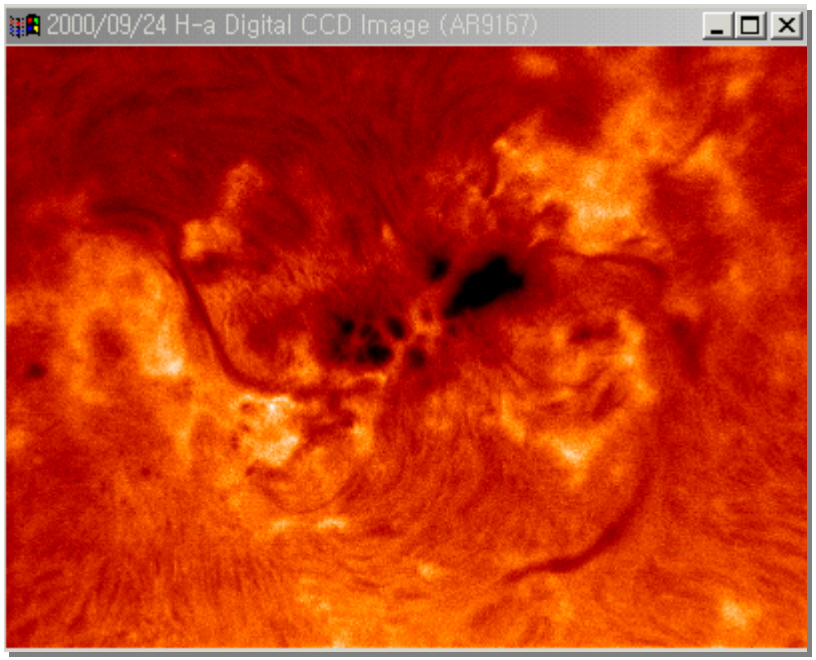


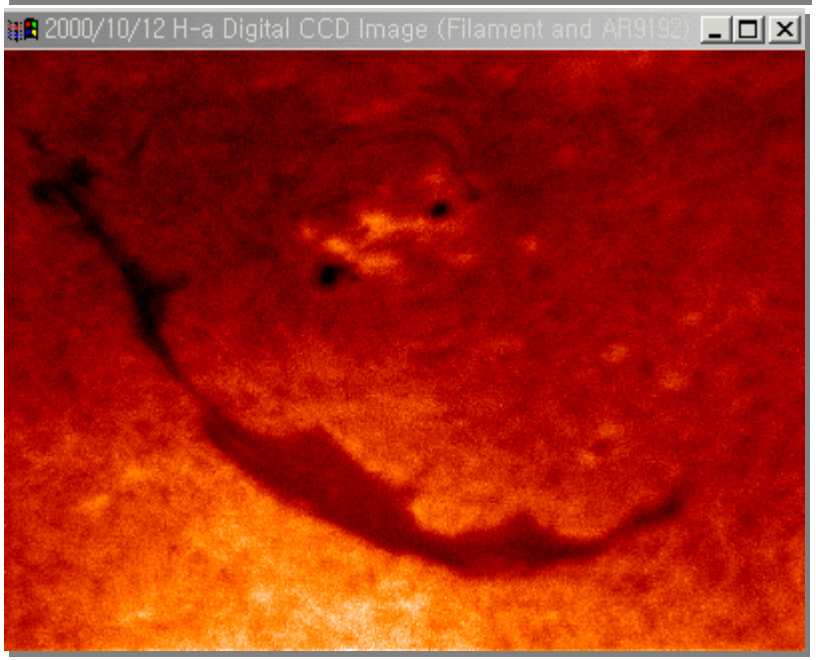
SOFT Images

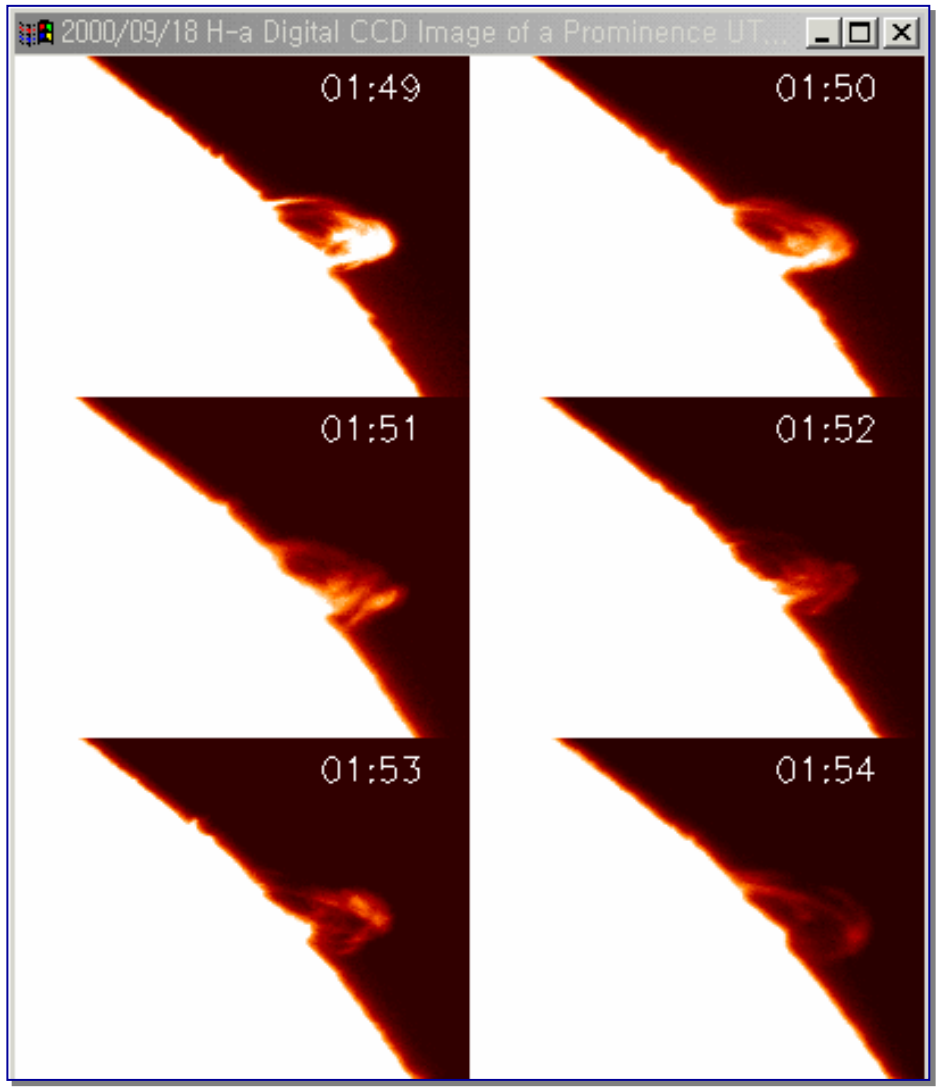
W/L Image



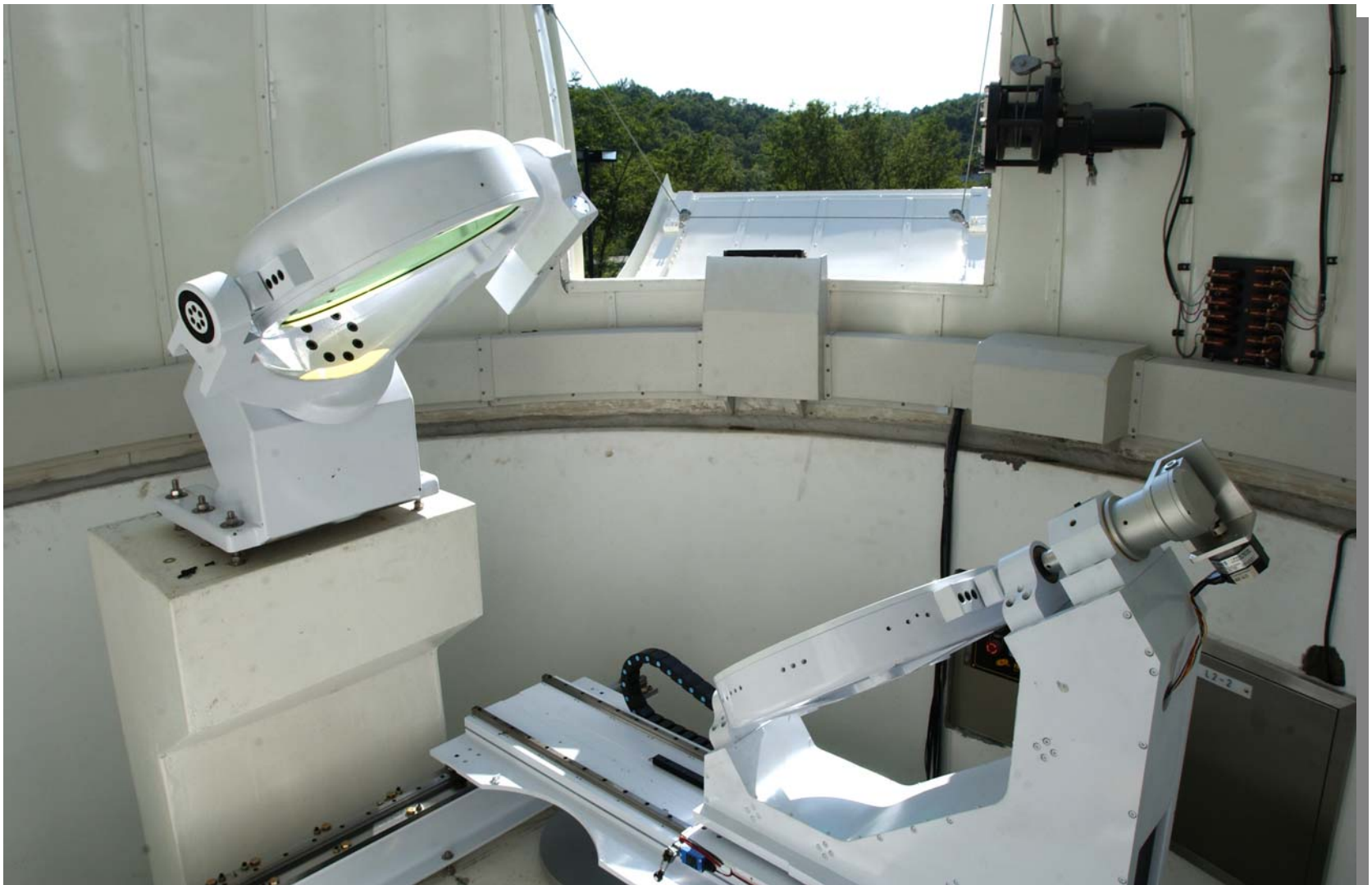
Filament and Prominence







Spectroscopic System



(1) Telescope

Diameter of objective mirror: 30 cm

Focal length: 9,000 mm

Disk size of the Sun at focal plane: ~ 87 mm

(2) Spectrograph

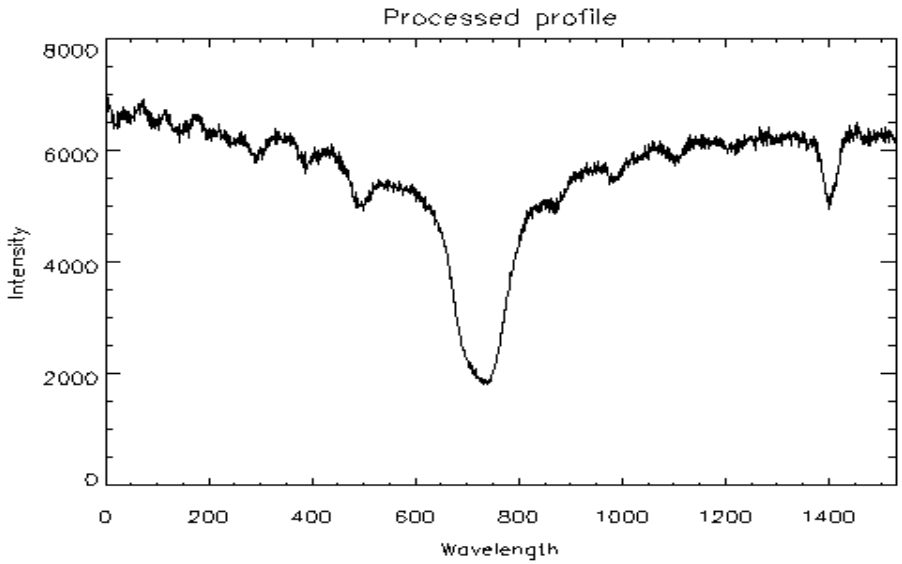
Observing spectral range: 5000 Å ~ 8000 Å

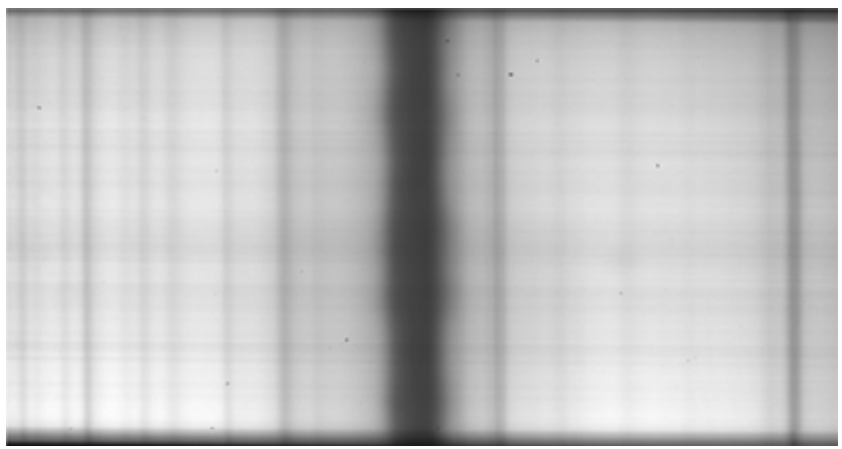
Linear dispersion: 0.01Å/pixel (1 Å/mm) for 3rd order

(3) Objective

Physical quantities of active region: velocity and temperature

❑ Test Observation : H alpha line





Future Plans

- **Continuous improvement of the SOFT and the spectroscopic system**
- **Dev. of the full-disk H-alpha monitoring system: join to Global H-alpha Network**
- **Dev. of the polarimetric observation system of prominences**

Research Activities

- **Study of solar atmosphere**
  - **Eclipse expedition: 1994, 2001, 2006(?)**
  - **Solar activities: CMEs, Flares, filaments, and radio bursts etc.**
- **Interplanetary shock propagation**
- **Space weather research**

Personal Interests

- **Flare-associated X-ray plasma ejections**
  - **Flare-associated ejections of coronal hot plasma**
  - **Yohkoh/SXT image, impulsive phase of flare**
  - **Closely related with magnetic reconnection**
  - **Morphology: blob-like, loop-like, jet-like, or complex shape**

- **Scientific importance**
  - **Possible candidate for CME signatures seen in X-rays**
  - **It can give us the information on the early stage of CME propagation**
  - **Need more studies on the relation with other solar activities – flares and CMEs**

Thank you for your attention !

- **URL of our homepages**

  1. Solar Activity Research Lab.

  http://www.kao.re.kr/~solarnrl/main.htm

  2. Solar Flare Telescope

  http://www.boao.re.kr/~yjmoon/softmain.html