

Optical Solar Telescopes and Observation Programs in Japan

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available data in 1992 by optical telescopes

	time resolution	object
• white light image	full disk ~ 1/day A.R. ~ 10 sec	sunspot evolution white light flare
• H α image/velocity	full disk ~ 1 min., sec A.R. ~ 1 sec	flare patrol chromospheric fine structures
• HeI 10830 image	full disk ~ 1/day A.R. ~ 1 min	corona hole dark & bright points variation
• photospheric velocity field	A.R. ~ 30 sec	disturbance from photosphere
• vector magnetic field	A.R. ~ 30 sec	magnetic configuration & energy storage
• corona image around the sun	full ~ 1 min.	10 ⁷ K plasma & CME onset
• various spectroscopic data for special purpose		

Object

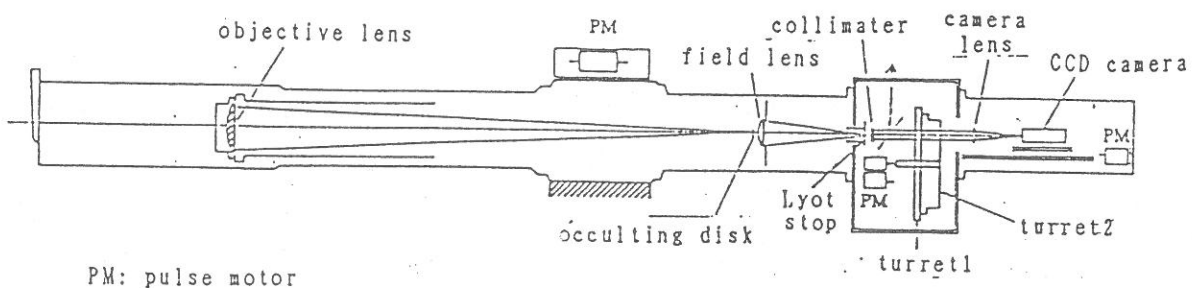
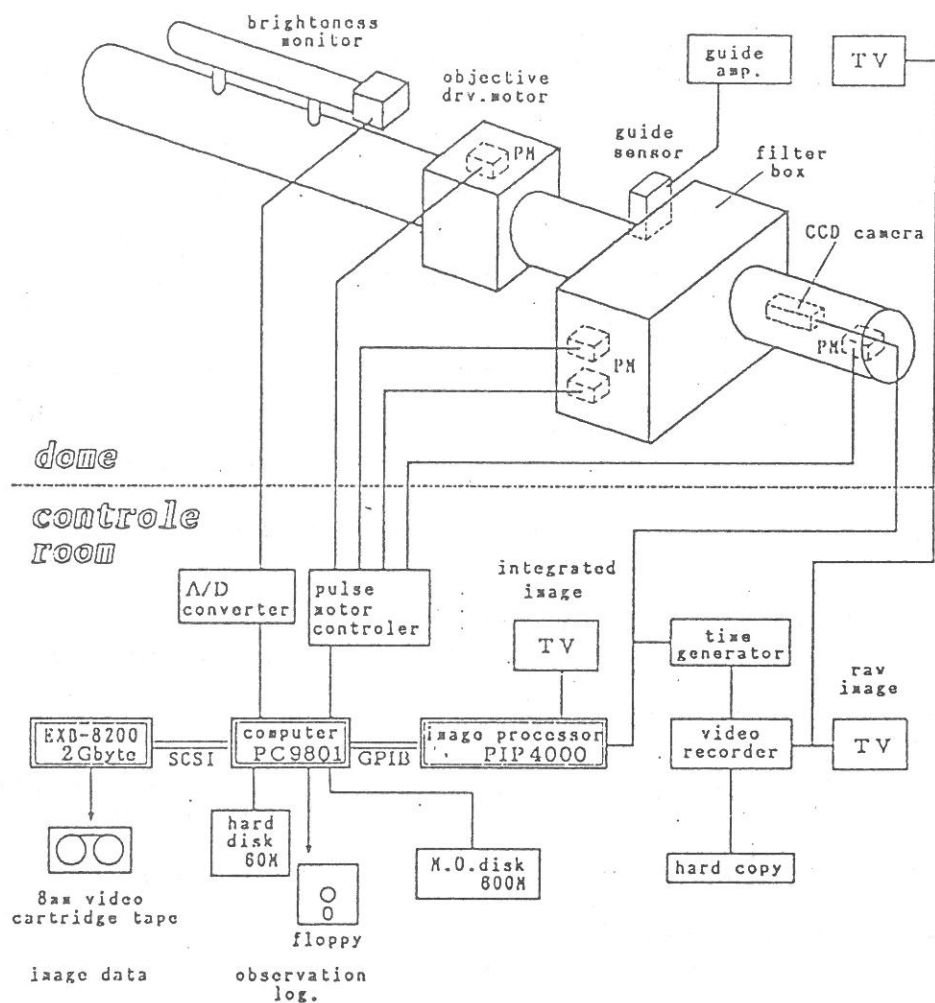
To detect 10⁷ K flare plasma on the limb

$$\left. \begin{array}{l} 6630 \text{ \AA} \text{ intensity} \rightarrow n_e \cdot l \\ \text{soft-X ray} \rightarrow n_e^2 \cdot l \end{array} \right\} n_e \cdot l$$

To detect the start of CME

Improvement of the data quality
is required /

10cm coronagraph system diagram



turret1	turret2	
	interference filters	$\Delta \lambda$
• color filter	• 5303 A (coronal line)	3.0 A
• infra. cut filter	• 6563 A (H α)	3.2 A
• ND filter	• 6630 A (continuum)	20.6 A
• mask for dark	• 10640A (")	27.4 A

Optical Solar Telescopes in Japan

— present situation —

◇ Mitaka (NAO)

- 12-cm refractor $H\alpha$ flare patrol
- 20-cm refractor sunspot sketch
- Solar Flare Telescope vector mag. field (in construction)

◇ Norikura Solar Observatory (NAO)

- 10-cm coronagraph coronal green line intensity, prominence
- 25-cm coronagraph HeII0830A image, corona spectroscopy
- 10-cm max coronagraph 2-D imaging of corona structures (in test)

◇ Okayama Astronomical Observatory (NAO)

- 65-cm coude telescope vector magnetic field

◇ Hida Observatory (Kyoto Univ.)

- Domeless Solar Telescope high resolution $H\alpha$ image, spectroscopy

◇ Kusan Observatory (Kyoto Univ.)

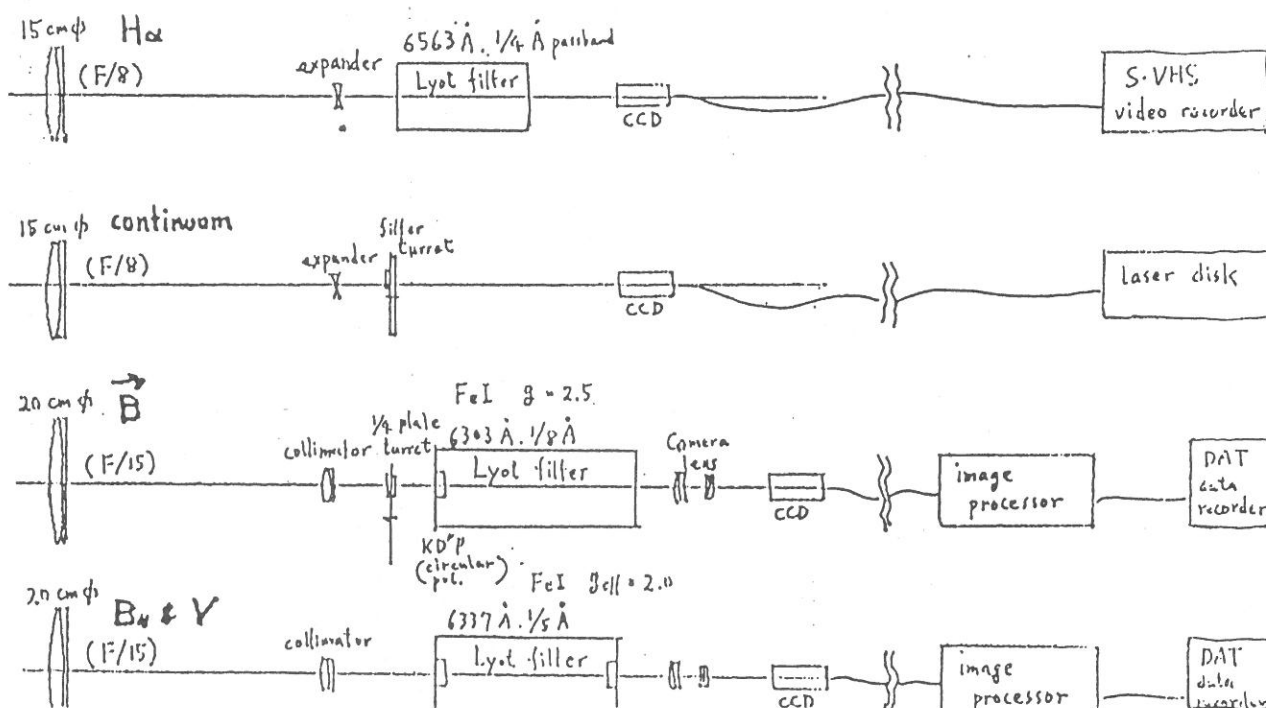
- 70-cm coelostat spectroscopy

◇ Shiga University

- 50-cm heliostat spectroscopy

◇ Hiraizo Solar-terrestrial Research Center

- (Communication Research Laboratory)
- 10-cm refractor white light image
- 8-cm refractor $H\alpha$ image



Purpose

to make simultaneous observations
of H α and continuum image, $\Rightarrow$ photospheric
velocity and magnetic field. and

to follow the evolution of A.R. before
and after the flare

to answer the questions :

* what is the most important factor
for producing flares?

|B|, current, time scale, surrounding

* what is the origin of magnetic shear?

photospheric motion $\rightarrow$ shear the mag. field?

or emerging flux is already sheared?

Schedule

now : H α and continuum started

1991.3 : 6303 Å Lyot filter be completed

1991.8 : 6337 Å "

? :

Future Plans

Hiraiso Solar-Terrestrial Research Center

[H α telescope (15cm + Zeiss Lyot filter) $\sim$ '91
Vector Magnetograph (20cm, 6337Å Lyot filter) $\sim$ '93
Corona Hole telescope (He I 6683Å filter) $\sim$ '96

wide field of View

$\rightarrow$ flare forecasting

Solar Cycle Telescope (NAO)

cluster of telescopes to make a continuous
observation of brightness, velocity, magnetic
field of the full disk with high accuracy.

