GAC Solar Telescope setup with Equatorial mount

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Introduction

- This set of slides convey some techniques in setting up a solar telescope with a tracking equatorial mount.
- The solar telescope shown is a Coronado PST.
- The mount shown here is Orion's EQ3 mount, but the same principles will apply to other non GO-TO tracking mounts.

1. Get local sidereal time

Local Sidereal Time Clock - Windows Internet Explorer

http://www.jgiesen.de/astro/astroJS/siderealClock/

File Edit View Favorites Tools Help http://www.jgiesen.de/astro/astroJS/siderealClock/

Goddard Astronomy... | Local Sidereal Ti...

Page

Date: Oct 13 2008 Local Time: 17 50 Now

Location: Longitude 77 deg W Time Zone:

Washington DC Apply Long. -4

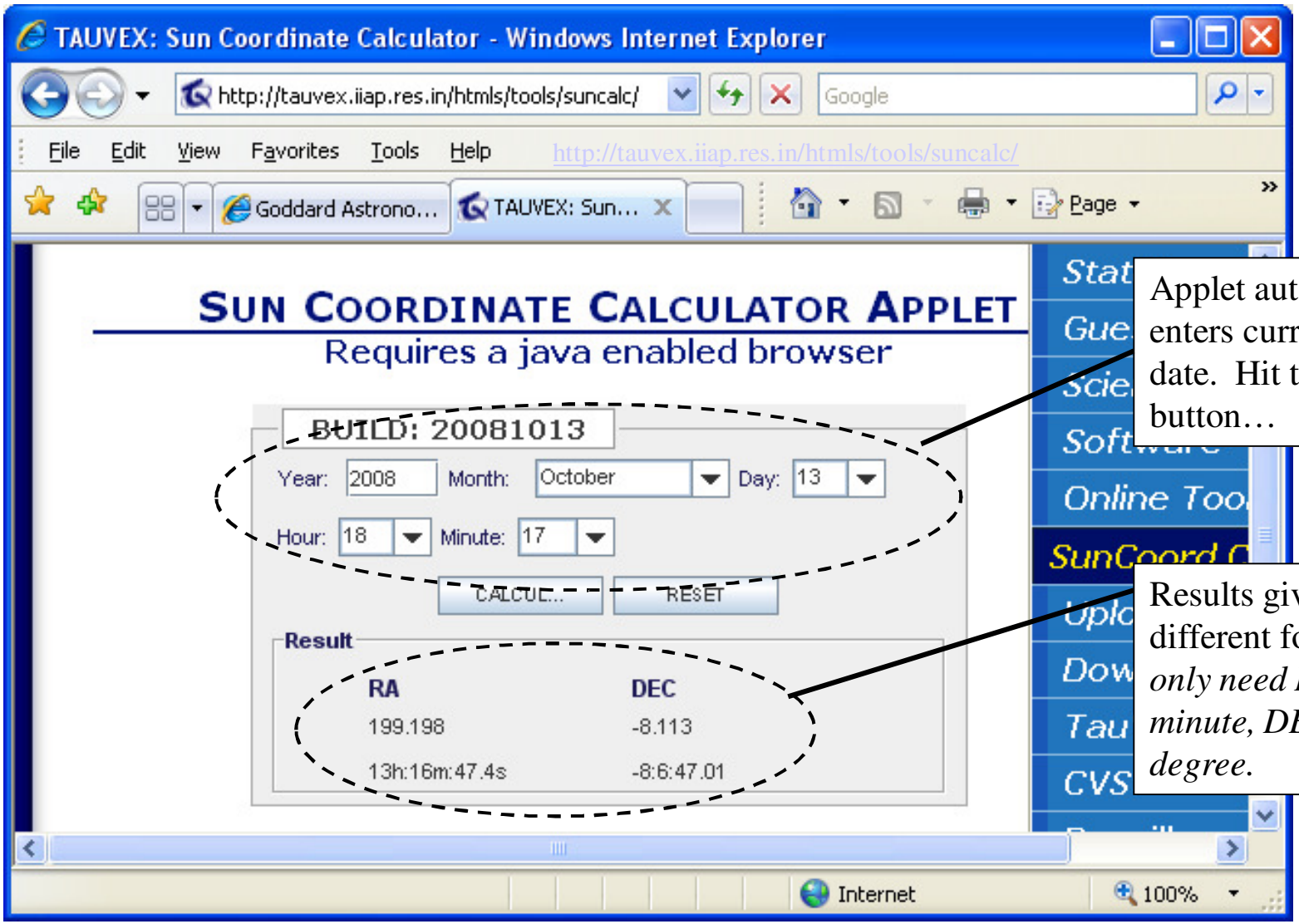
Local Date and Time:	2008, Oct 13 at 17:50:16
UT is:	2008, Oct 13 at 21:50:16
the Julian Day is:	2454753.40991
the Local Sidereal Time is:	18:13:33
the Declination of the Sun is:	-8.17 deg
the Equation of Time is:	13.946 min

Done Internet 100%

Set to -4 for summer time

Note the difference: Sidereal time is approximately 23min fast in this case. *Set your watch to sidereal time or remember the difference.*

2. Get sun's coordinates



Applet automatically enters current time and date. Hit the CALCUL button…

Results given in two different formats. *We only need RA to nearest minute, DEC to nearest degree.*

3. Set mount up facing north

Set the mount with the RA axis pointing **approximately** north.

Make sure its tilt angle is set to the local latitude, i.e. about 39° for GSFC.

4. Level telescope mount

5a. Point scope to zenith

Loosen RA and DEC clutches.

Point the scope straight up with the help of water level.

Tighten clutches again.

The scope is now pointing at the celestial **R**ight **A**scension longitude corresponding to local sidereal time, and the celestial **DEC**lination corresponding with your local latitude position on earth.

5b Check DEC


DEC indication should show your local latitude position on earth at this stage

6. Set RA setting circles to Sidereal Time

(a) Slide setting circles to indicate current sidereal time (use watch set to sidereal time earlier), which was about 16:02 at the time of this photograph.

(b) Switch tracking on

The RA setting circles are now calibrated!

7. Rotate Scope to Sun's RA

(a) Loosen **RA clutch**, and push the scope over so that the RA setting circles indicates the sun's RA position (13:12 in this case). Re-tighten the RA clutch.

8. Rotate Scope to Sun's DEC

(a) Loosen the **DEC clutch**, and push the scope over so that the DEC setting circles indicates the sun's DEC position (-8° in this case). Re-tighten the DEC clutch.

9a Rotate in Azimuth to find sun

At this stage, the only uncertainty in the scope's orientation is with respect to the North vector. Loosen the azimuth lock and rotate the mount until the sun is visible in the solar scope's finder.

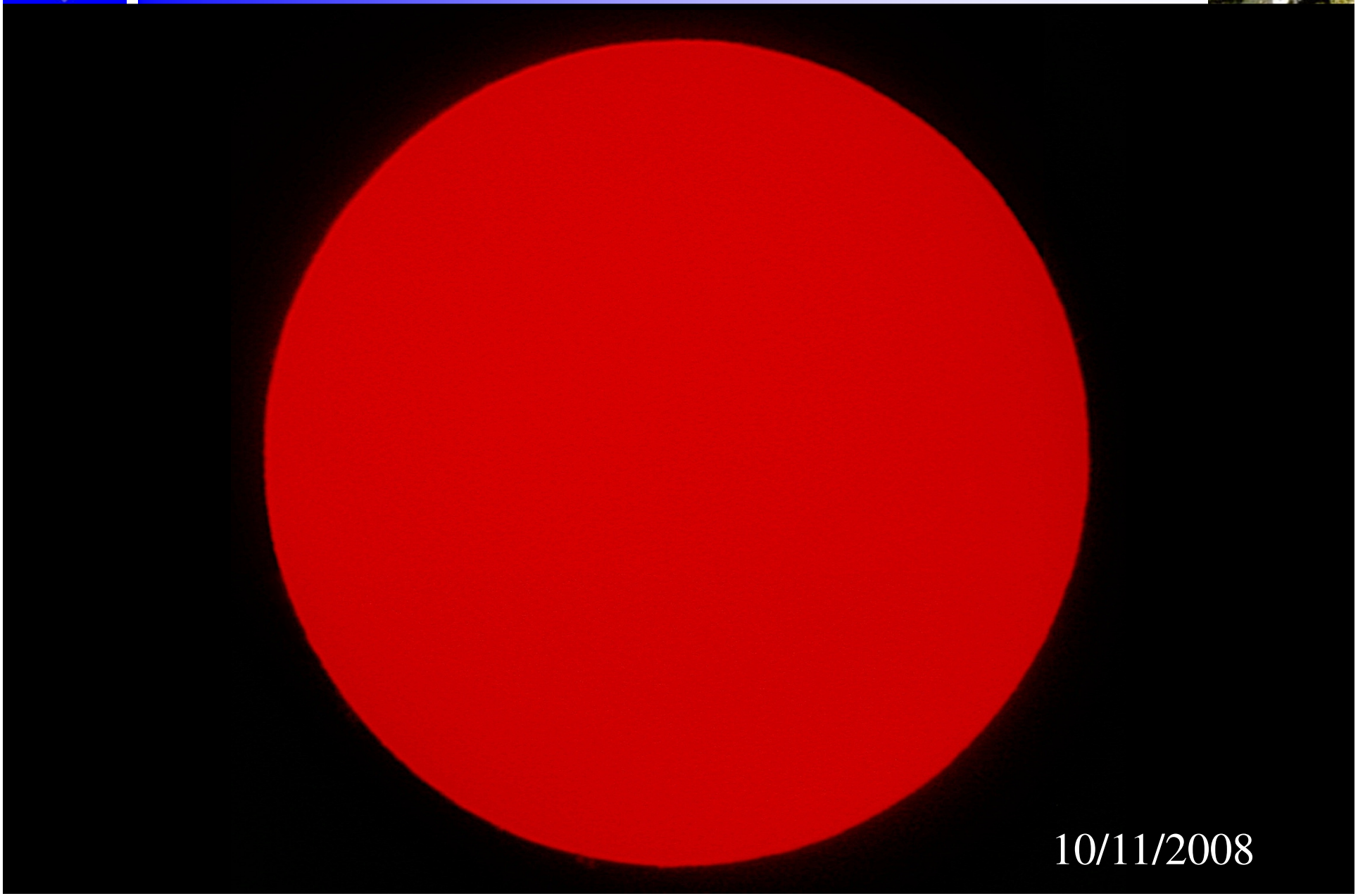
9b Rotate in Azimuth to find sun

Rotate the mount in azimuth until the sun is as close as possible to the center of the finder's field of view. Any off-center error at this stage is due to set-up in-accuracies up till this point. Tighten the azimuth lock.

Do the final fine adjustments using the RA and DEC controls to center the sun. If large adjustments is needed, tracking will be less than optimal, so it may be best to start fresh, trying to eliminate errors to minimize inaccuracies.

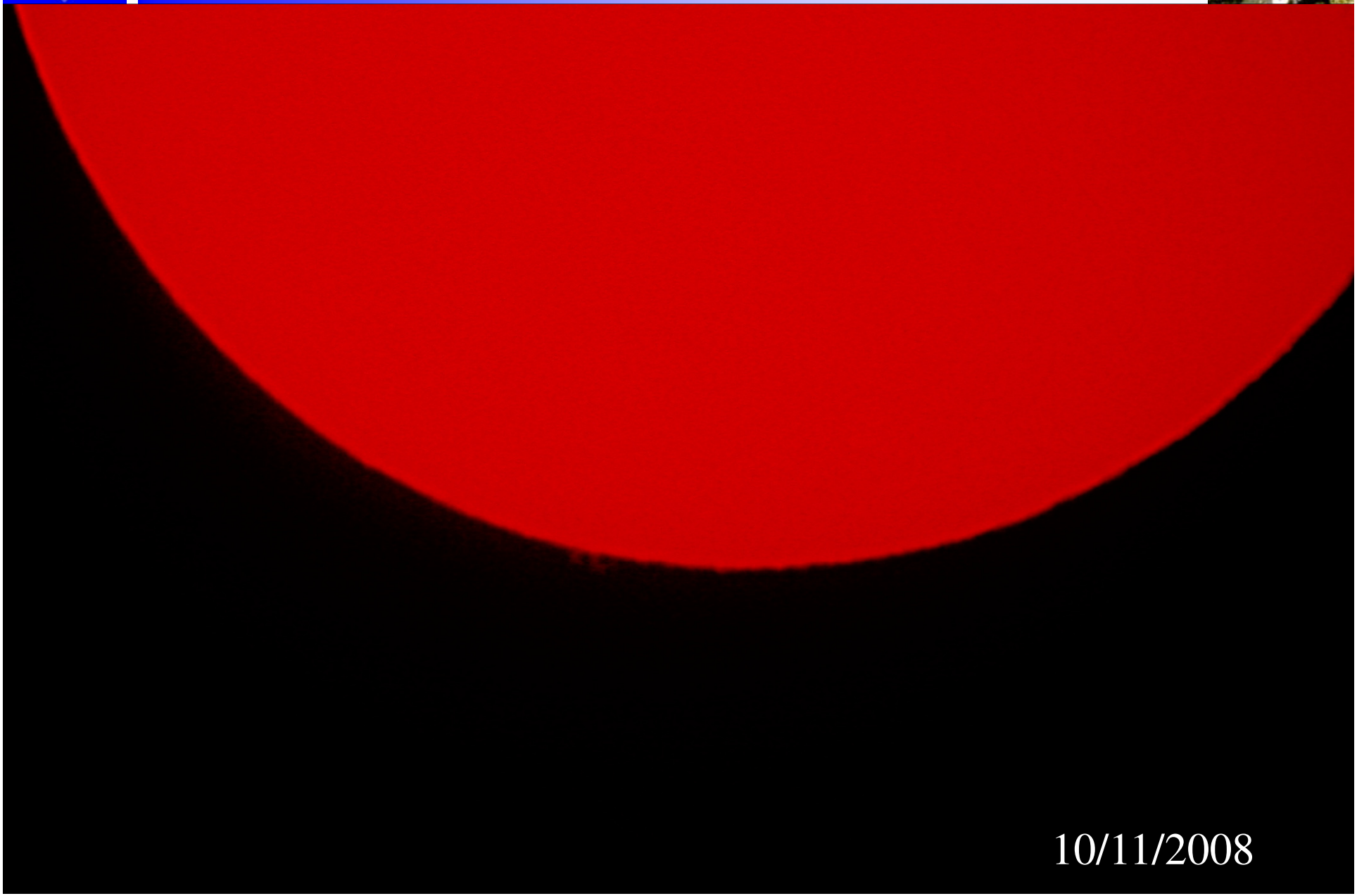
10. Observe!

Some results



10/11/2008

Some results



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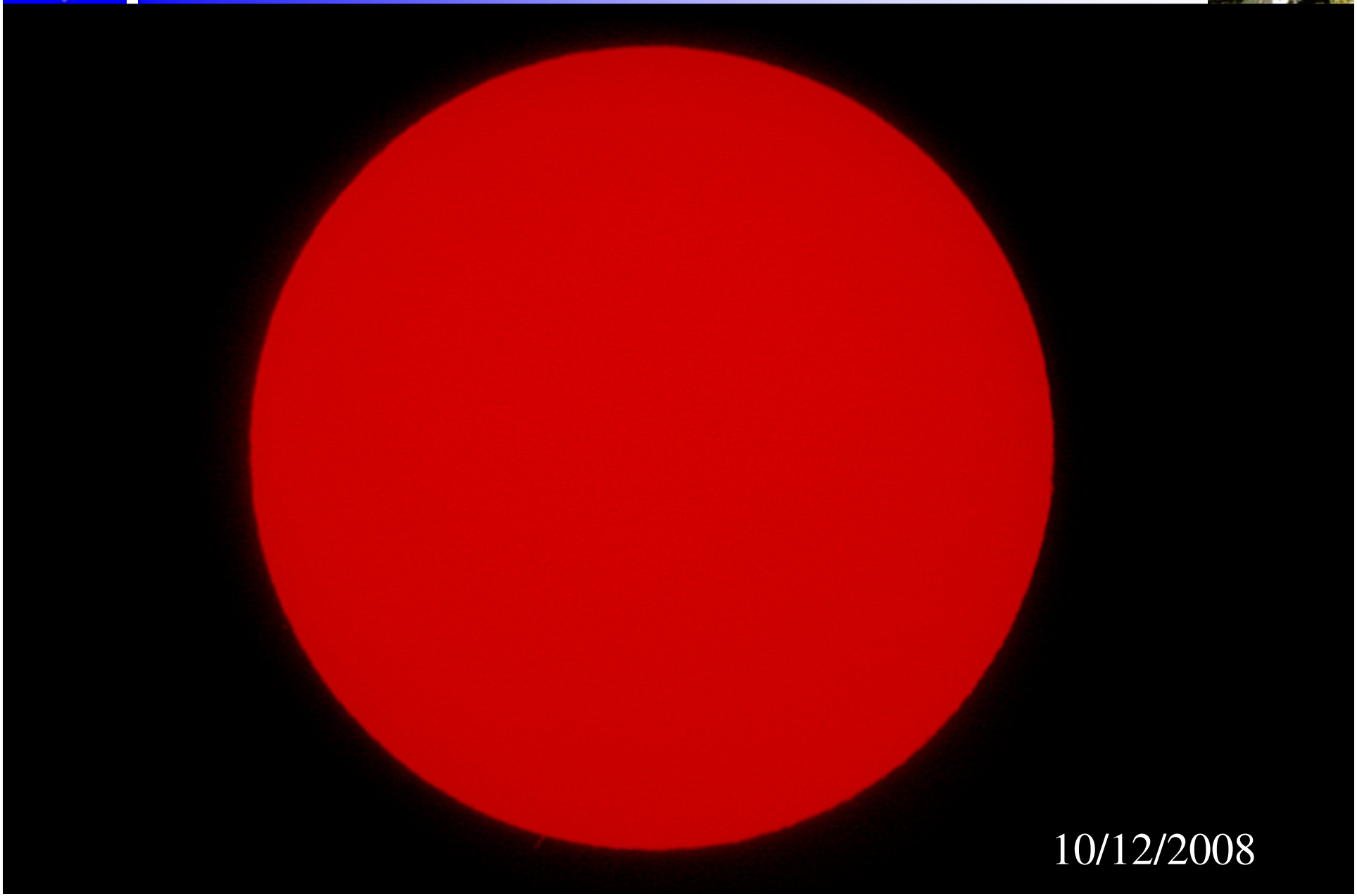
Some results



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Conclusions

- Setting up a solar scope during the daytime has been explained.
- The same principles can be adapted for GO-TO mounts: Instead of steps 5 to 8, let the GO-TO mount do its initial alignment setup, and then steer it to the sun's coordinates. In the process, the GO-TO computer will ask for confirmation in locating and centering at least two stars, which of course will not be visible. In each of these cases, just confirm that the star is centered and proceed with the setup.