

Alain ROBERT

# Model of the

# Solar

# System

scale :

$$\frac{1}{4\ 250\ 000\ 000}$$

Same scale for the size of the planets  
and the distances

500 000 km



## Paternité-Pas d'Utilisation Commerciale-Partage des Conditions Initiales à l'Identique 2.0 France

<http://creativecommons.org/licenses/by-nc-sa/2.0/fr/>

### You êtes libres :



de reproduire, distribuer et communiquer cette création au public



de modifier cette création

### Selon les conditions suivantes :



**Paternité.** Vous devez citer le nom de l'auteur original de la manière indiquée par l'auteur de l'oeuvre ou le titulaire des droits qui vous confère cette autorisation (mais pas d'une manière qui suggérera qu'ils vous soutiennent ou approuvent votre utilisation de l'oeuvre).



**Pas d'Utilisation Commerciale.** Vous n'avez pas le droit d'utiliser cette création à des fins commerciales.



**Partage des Conditions Initiales à l'Identique.** Si vous modifiez, transformez ou adaptez cette création, vous n'avez le droit de distribuer la création qui en résulte que sous un contrat identique à celui-ci.

- A chaque réutilisation ou distribution de cette création, vous devez faire apparaître clairement au public les conditions contractuelles de sa mise à disposition. La meilleure manière de les indiquer est un lien vers cette page web.
- Chacune de ces conditions peut être levée si vous obtenez l'autorisation du titulaire des droits sur cette oeuvre.
- Rien dans ce contrat ne diminue ou ne restreint le droit moral de l'auteur ou des auteurs.

*Ce qui précède n'affecte en rien vos droits en tant qu'utilisateur (exceptions au droit d'auteur : copies réservées à l'usage privé du copiste, courtes citations, parodie...)*

Ceci est le Résumé Explicatif du Code Juridique  
(la version intégrale du contrat - <http://creativecommons.org/licenses/by-nc-sa/2.0/fr/legalcode>).

# Model of the Solar System

This document will enable you to make a model of the solar system in which planets and distances between planets are on the same scale.

Aim :

To enable students to realize about distances between solar system objects

Data :

Calculation based on the Earth is represented by a sphere of diameter 3 mm

| Object                          | Actual distance from the Sun (AU) | Distance to the model of the Sun (m) | Real equatorial diameter (km) | Diameter on the model (mm) | Period revolution    |
|---------------------------------|-----------------------------------|--------------------------------------|-------------------------------|----------------------------|----------------------|
| Sun                             | -                                 | -                                    | 1 390 000                     | 327                        | -                    |
| Mercury                         | 0.39                              | 13.72                                | 4 880                         | 1.15                       | 88 days              |
| Vénus                           | 0.72                              | 25.33                                | 12 100                        | 2.85                       | 224.7 days           |
| Earth                           | 1                                 | 35.19                                | 12 756                        | 3                          | 365.24 days          |
| Mars                            | 1.52                              | 53.48                                | 6 794                         | 1.6                        | 687 days             |
| Jupiter                         | 5.2                               | 182.95                               | 143 200                       | 33.7                       | 11.86 years          |
| Saturn                          | 9.54                              | 335.65                               | 120 000                       | 28.2                       | 29.46 years          |
| Uranus                          | 19.18                             | 674.82                               | 52 290                        | 12.3                       | 84 years             |
| Neptune                         | 30.06                             | 1 057.6                              | 50 450                        | 11.9                       | 165 years            |
|                                 | Distance to Earth                 | Distance to the model of the Earth   |                               |                            | Around the Earth     |
| Moon                            | 0.00257                           | 0.090                                | 3 472                         | 0.82                       | 29 d 12 h 44 min (1) |
| Nearest Star:<br>alpha Centauri | 4,2 LY                            | 9416 km                              |                               |                            |                      |

1 AU (astronomical unit) = 149 597 870 km

1 LY (light year) ~ 10 000 000 000 000 km

(1) lunation

## USE

Preparation:

Print this document using a color printer, place the entries corresponding to celestial objects in mounts. Get a tape measure or realize a system for measuring distances (0-100 m) by placing visual markers on a cord.

Print this document using a color printer, put the cards corresponding to celestial objects in protection sleeves. Get a tape measure or make a system for measuring distances (0-100 m) by setting visual markers on a cord. Put the panels representing the sun and the planets to the distances shown in the chart displayed on the previous page. After the "Mars" panel, place the other panels indicating the corresponding distances. If your ground is not large enough, with the help of the local authorities select a nearly straight street or avenue at least 1100 m and rename it (temporarily) "Solar System Avenue"

Make a general presentation panel of the model (to be placed near the "Sun" sign) and photographic panels on each planet using such an astronomy CD or photographs taken from ESA or NASA sites.

<http://www.esa.int/ESA>

<https://www.nasa.gov/>

After having surveyed the selected avenue, place the different panels at suitable distances. It is also possible with the help of a geographer to locate the orientation of the avenue and calculate in which place in the world in the world you should put the panel "Proxima Centauri".

**Thank you to Daniel for translation help**

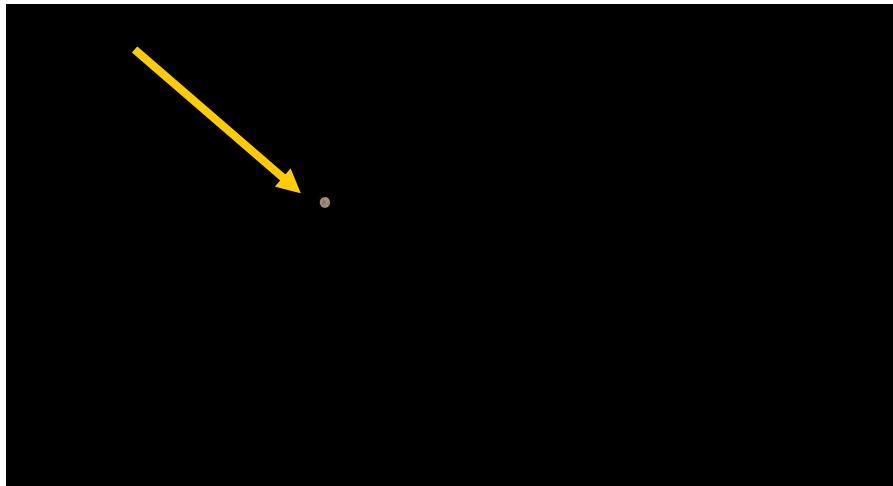
# **Sun**

**Diameter:**  
**1,391,000 km**

**Temperature:**  
**5,750 C (surface)**  
**15,000,000 C (center)**

**Rotation period:**  
**25 days (at the equator)**  
**34 days (at the poles)**

# Mercury



**Diameter: 4878 km**

**Average distance to the Sun:  
58 million km**

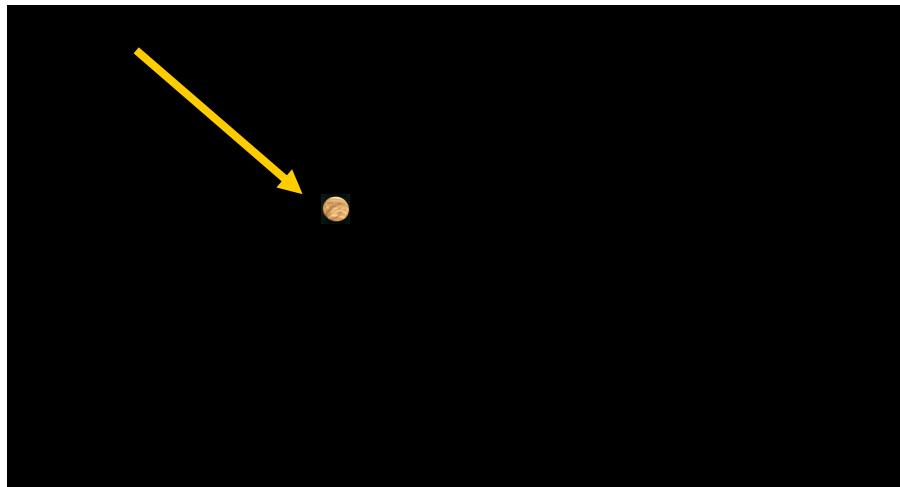
**Revolution around the Sun:  
87.97 Earth days**

**temperatures:**

**Low: - 170 C (dark side)**

**Max: 400 C (light side)**

# Venus



**Diameter: 12 100 km**

**Average distance to the Sun:  
108 million km**

**Revolution around the Sun:  
224.7 days**

**Temperature:  
460 C**

# **Earth Moon**



**EARTH**

**diameter:**

**Ecuador: 12 756 km**

**Poles: 12 713 km**

**Average distance to the Sun:**

**149,600,000 km**

**Revolution around the Sun:**

**365,2422 days**

**temperatures:**

**Min: - 89.9 C (Antarctica, 1958)**

**Max: + 58 C (Libya, 1922)**

# Earth Moon



## MOON

**Diameter 3 476 km**

**Average distance to the Earth:  
384 400 km**

**Revolution around the Earth:  
Sidereal: 27 days 7 hours 43 min 11 s  
(relative to the stars)**

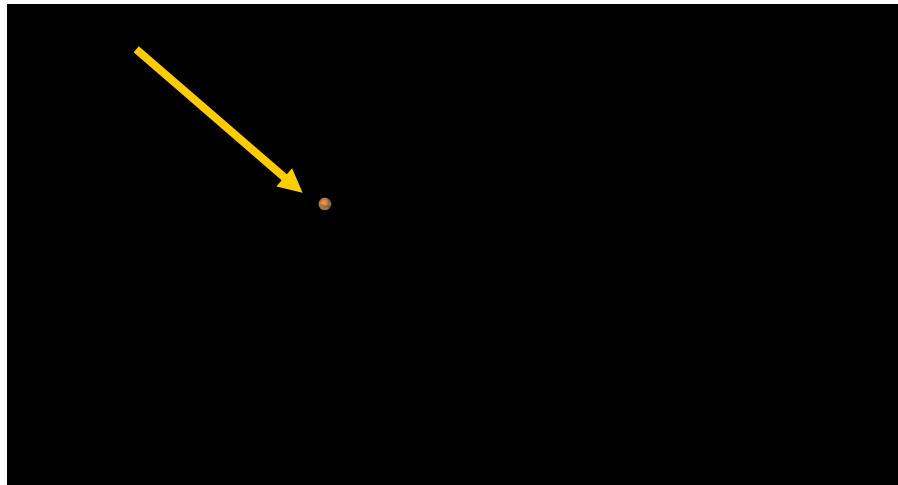
**Synodical: 29 j 12 h 44 min 3 sec  
(relative to the Sun = duration of a lunar month)**

## **temperatures:**

**Low: - 180 C (night)**

**Max: + 120 C (day)**

# Mars



**Diameter:**

**Ecuador: 6796 km**

**Poles: 6760 km**

**Average distance to the Sun:**

**227,940,000 km**

**Revolution around the Sun:**

**686.98 Earth days**

**temperatures:**

**Min: -143 C (South Pole, winter)**

**Max: + 22 C (equator at noon)**

# Jupiter



**Diameter:**

**Ecuador 142 796 km**

**Poles 133 540 km**

**Average distance to the Sun:**

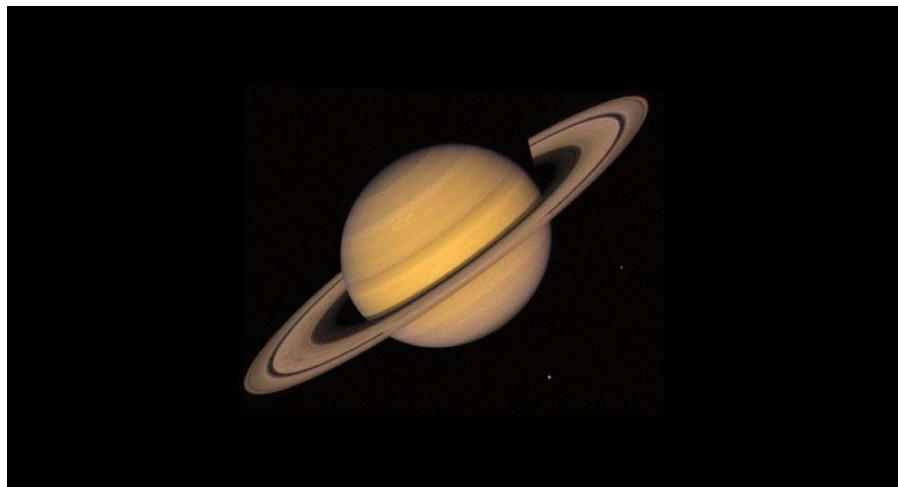
**778,300,000 km**

**Revolution around the Sun:**

**11 years 314.8 Earth days**

**Temperature: about -145 C**

# Saturn



**Diameter:**

**Ecuador 120 660 km**

**Poles 108 000 km**

**Average distance to the Sun:**

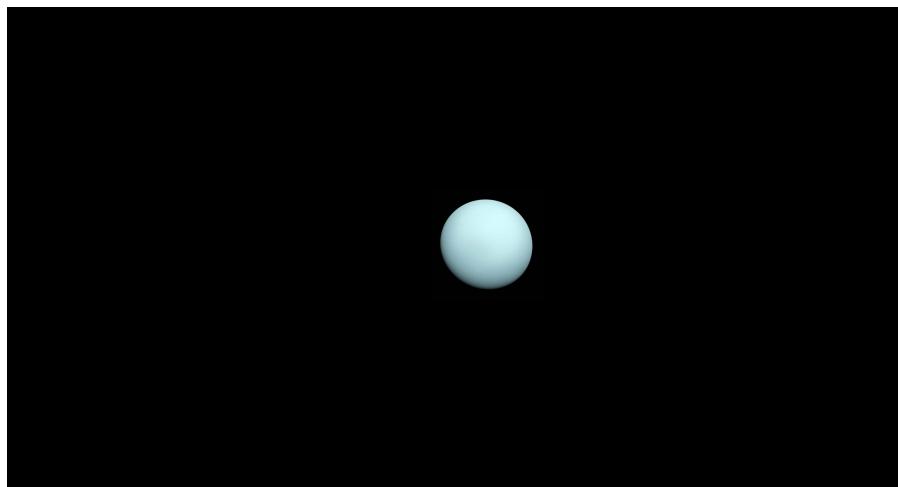
**1,429,400,000 km**

**Revolution around the Sun:**

**29 years, 167 Earth days**

**Surface temperature - 160 C**

# Uranus



**Diameter: 50 800 km**

**Average distance to the Sun:**

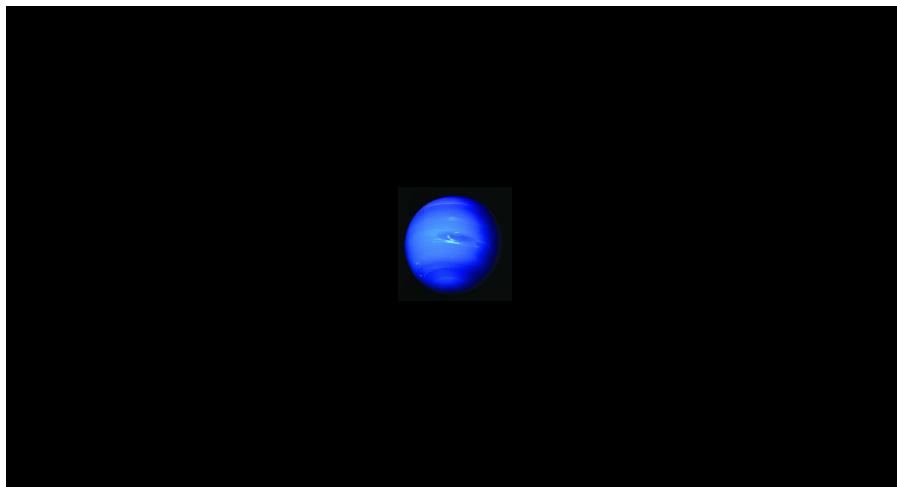
**2,875,000,000 km**

**Revolution around the Sun:**

**84 years, 7.4 Earth days**

**Surface temperature - 200 C**

# Neptune



**Diameter: 48 600 km**

**Average distance to the Sun:  
4,504,000,000 km**

**Revolution around the Sun:  
164 years, 280 Earth days  
Surface temperature - 220 C**

Nearest star:  
alpha  
Centauri



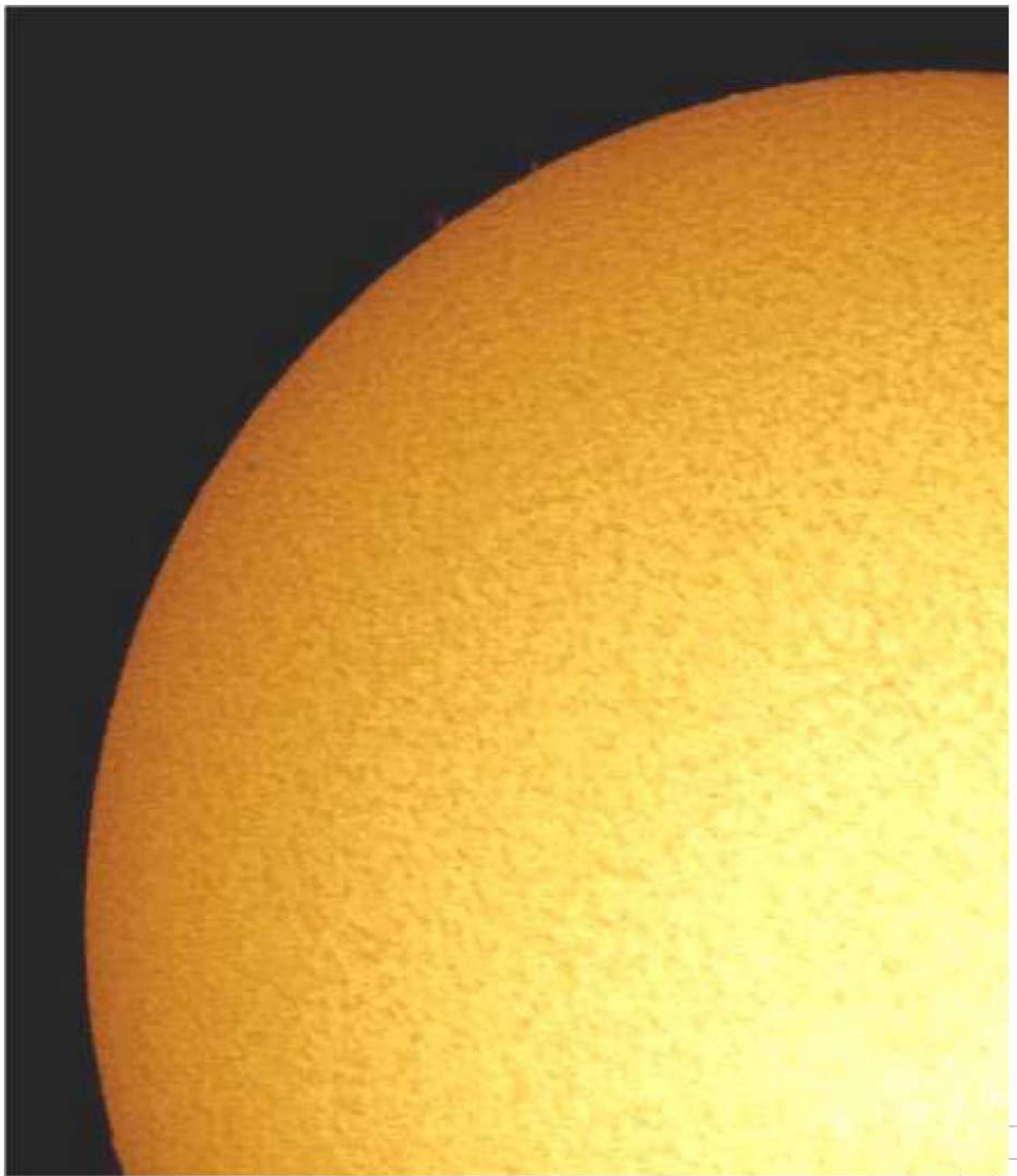
Distance to the Sun:  
4.2 light years  
approximately  
40 000 000 000 000 km

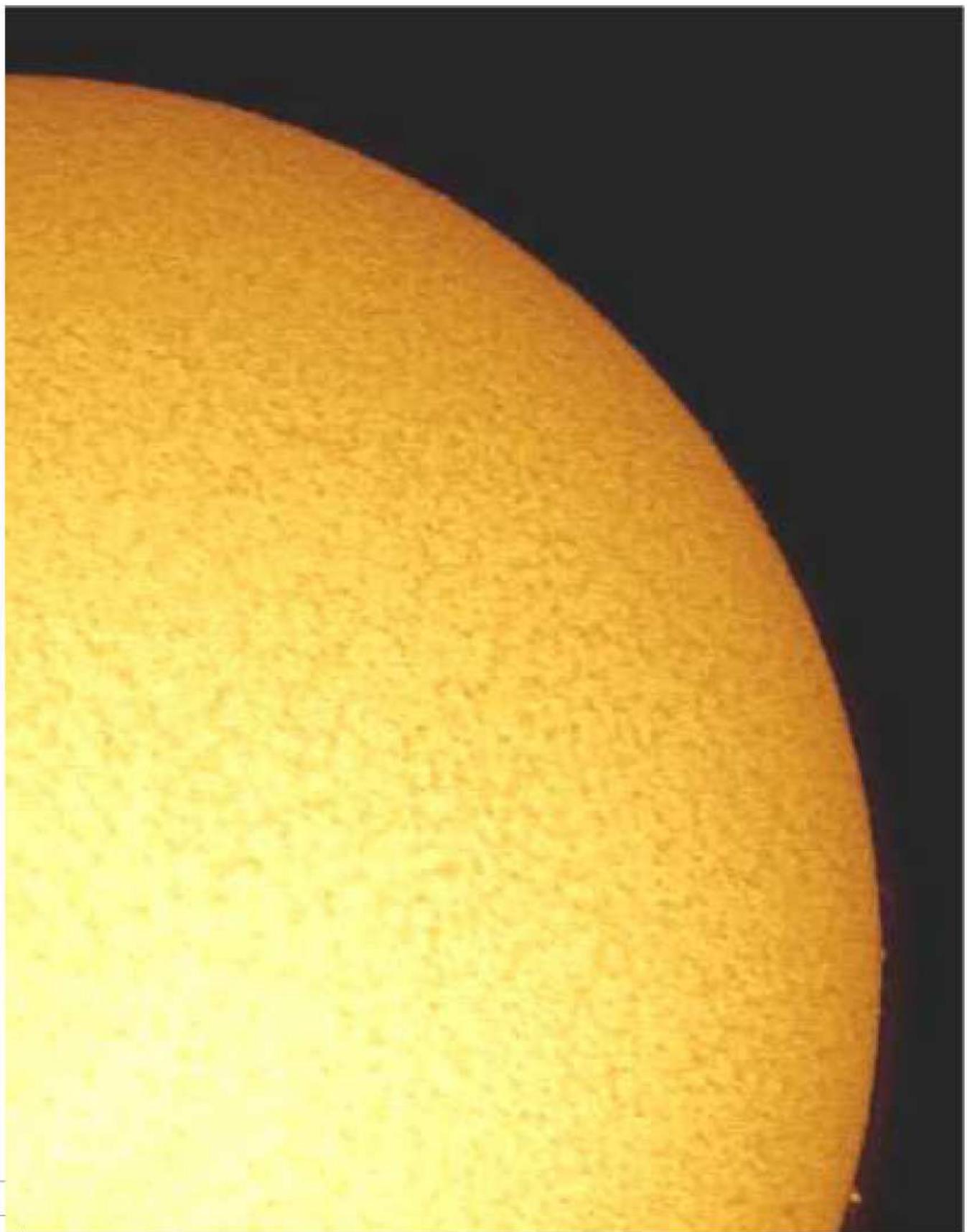
| Object  | Distance to the model of the Sun. |
|---------|-----------------------------------|
| Soleil  | -                                 |
| Mercury | 13.72 m                           |
| Venus   | 25.33 m                           |
| Earth   | 35.19 m                           |
| Mars    | 53.48 m                           |
| Jupiter | 182.95 m                          |
| Saturn  | 335.65 m                          |
| Uranus  | 674.82 m                          |
| Neptune | 1057.6 m                          |

Nearest star:  
Alpha Centauri      9416 km

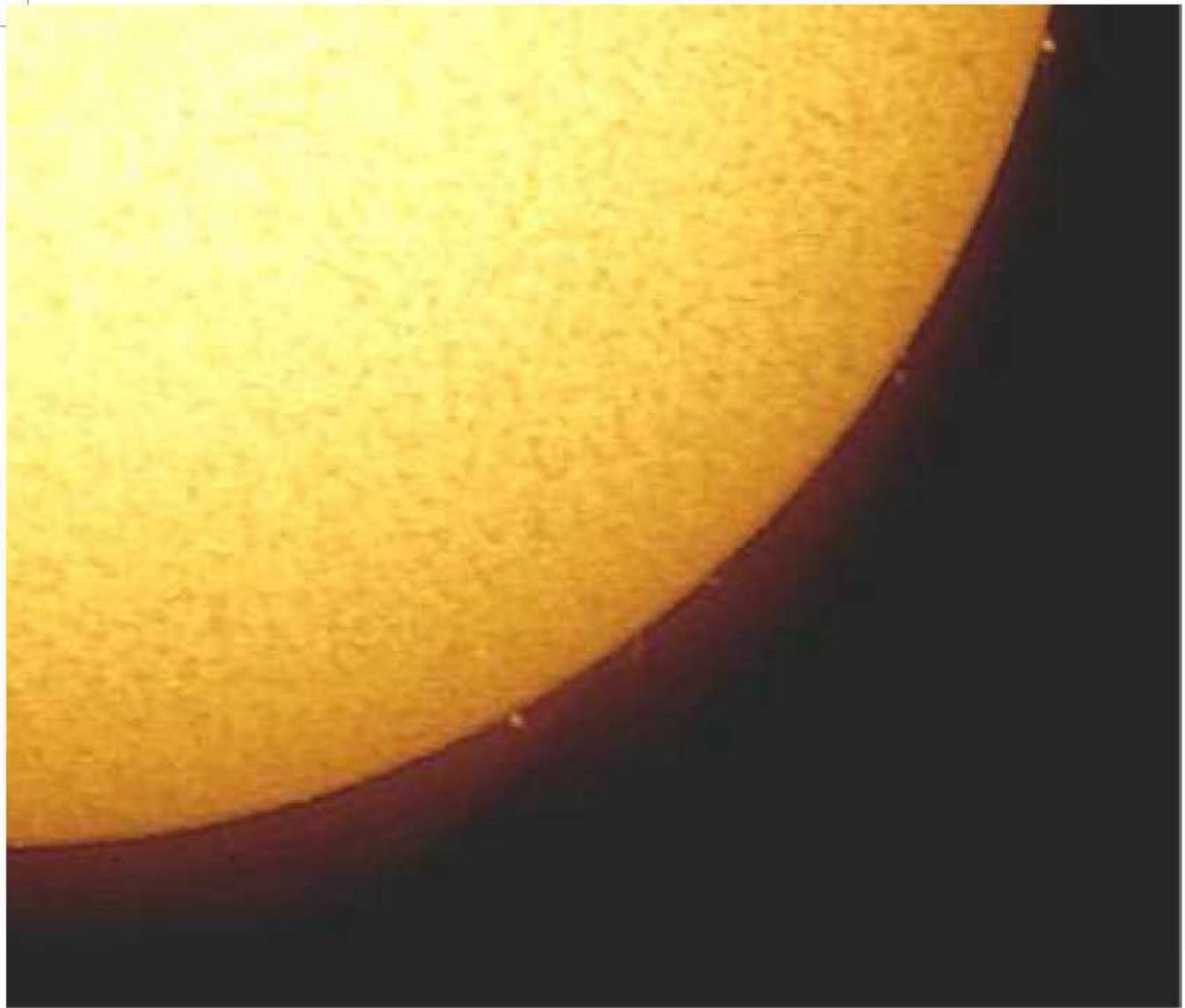
Moon: distance from Earth 0.090 m

The 4 following pages enable you to get a picture of the Sun on the same scale as those of the planets on the preceding pages ( join and stick the pieces together ). Use the marks shown on the edges of the pages ; cut and stick pieces, on a cardboard plate for instance . The last page enables you to print a "street sign" and rename temporarily the street where you will put the parts of the model









venue  
A  
s  
s  
e  
t  
e  
m  
b  
e  
r  
s  
o  
I  
a  
n