

WS 4

From the armillary sphere...

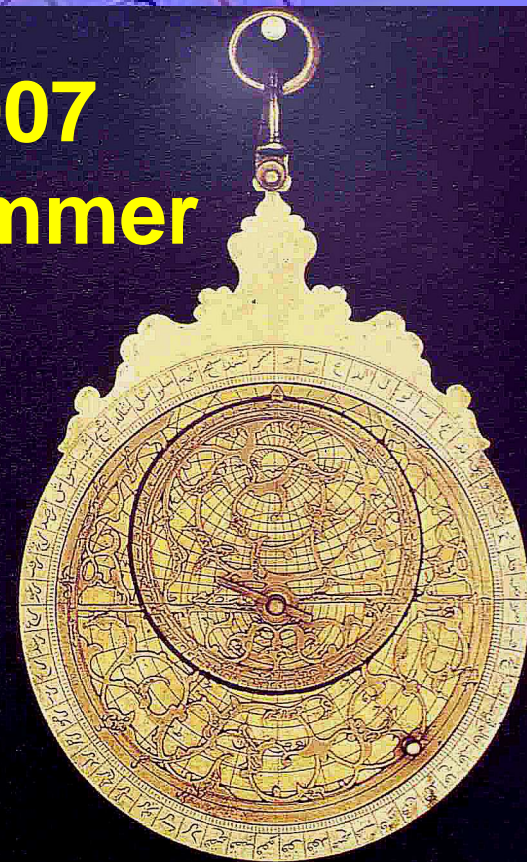
GARCHING

19 – 23 juillet 2007

1st ESO-EAAE summer
school



.....To the astrolabe

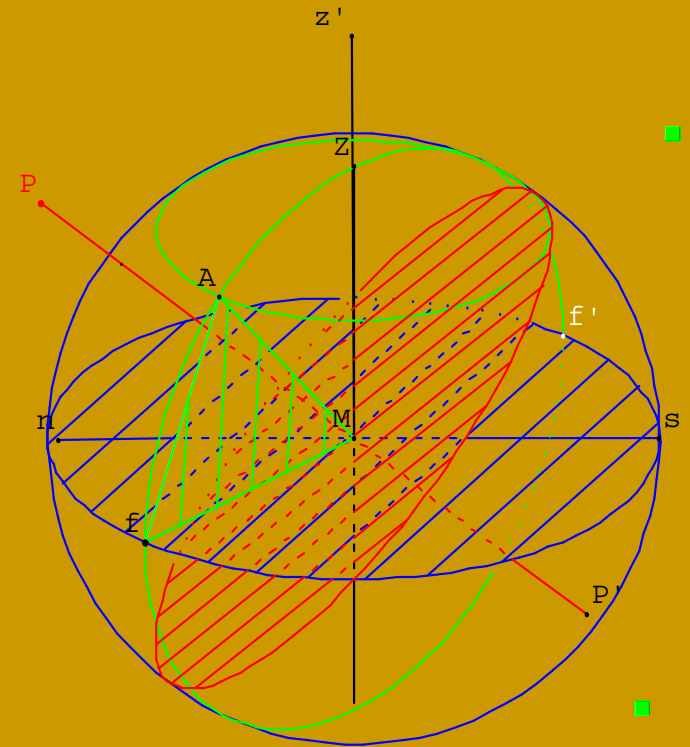
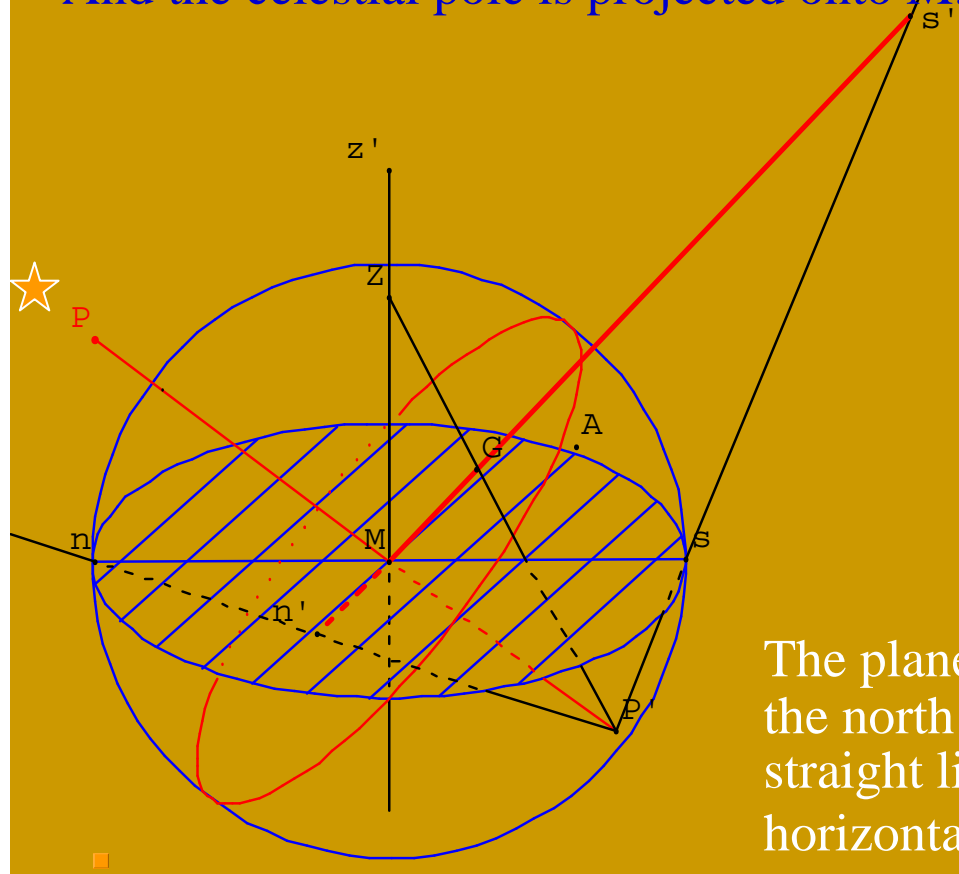


LOCATION ON THE ASTROLABE .

- Zenith is projected onto G
- The circle of the horizon is projected onto the circle with a diameter [n's']
- And the celestial pole is projected onto M.

Horizontal coordinates : the altitude

The circles of equal altitude are parallel to the local horizon.

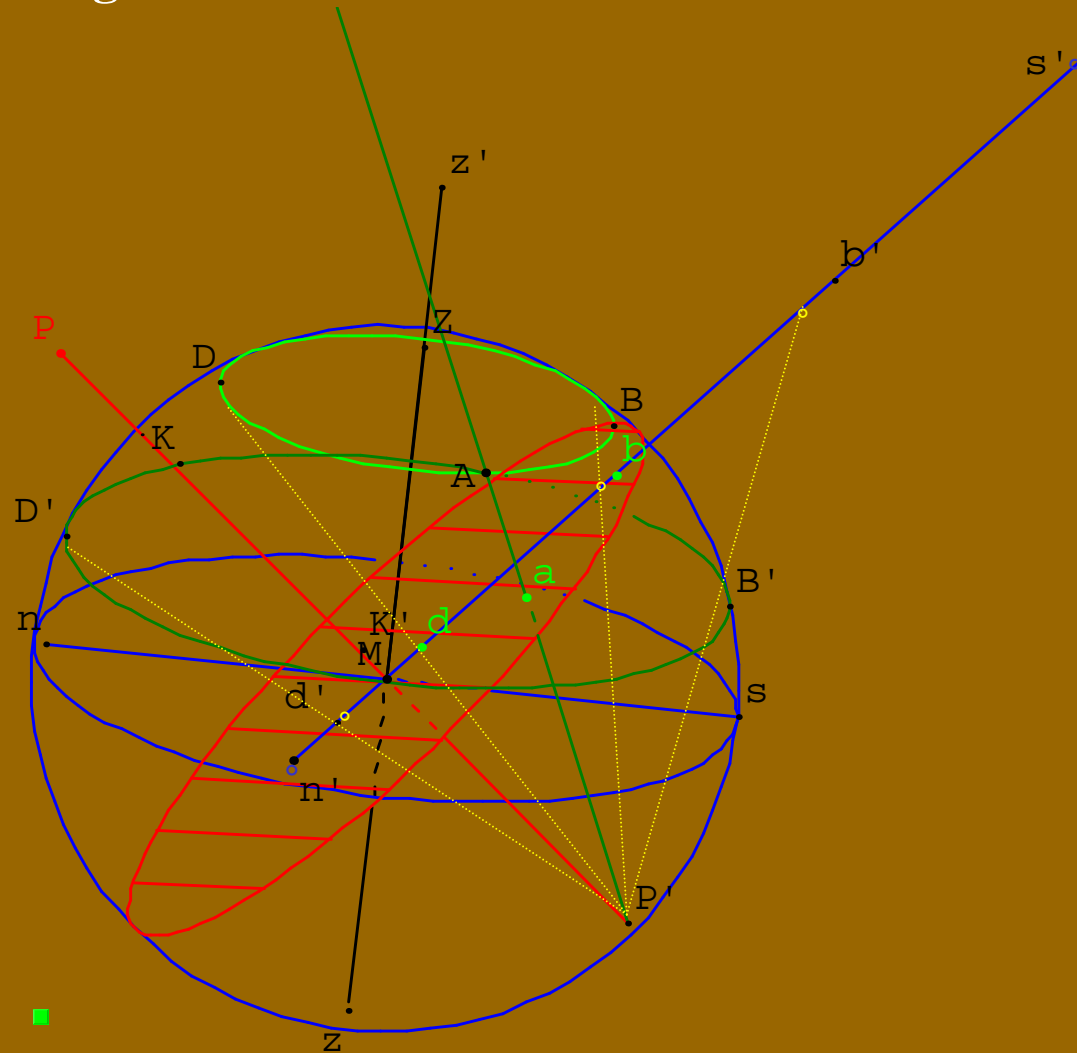


The plane of the screen contains the place, its zenith, the north south direction, that of the pole and the straight line (n's'), intersection of the projected horizontal plane with the equator .

It is the meridian plane of the observation place

PROJECTION OF THE CIRCLES OF EQUAL ALTITUDE

The angles are measured when the star crosses the meridian plane of the place

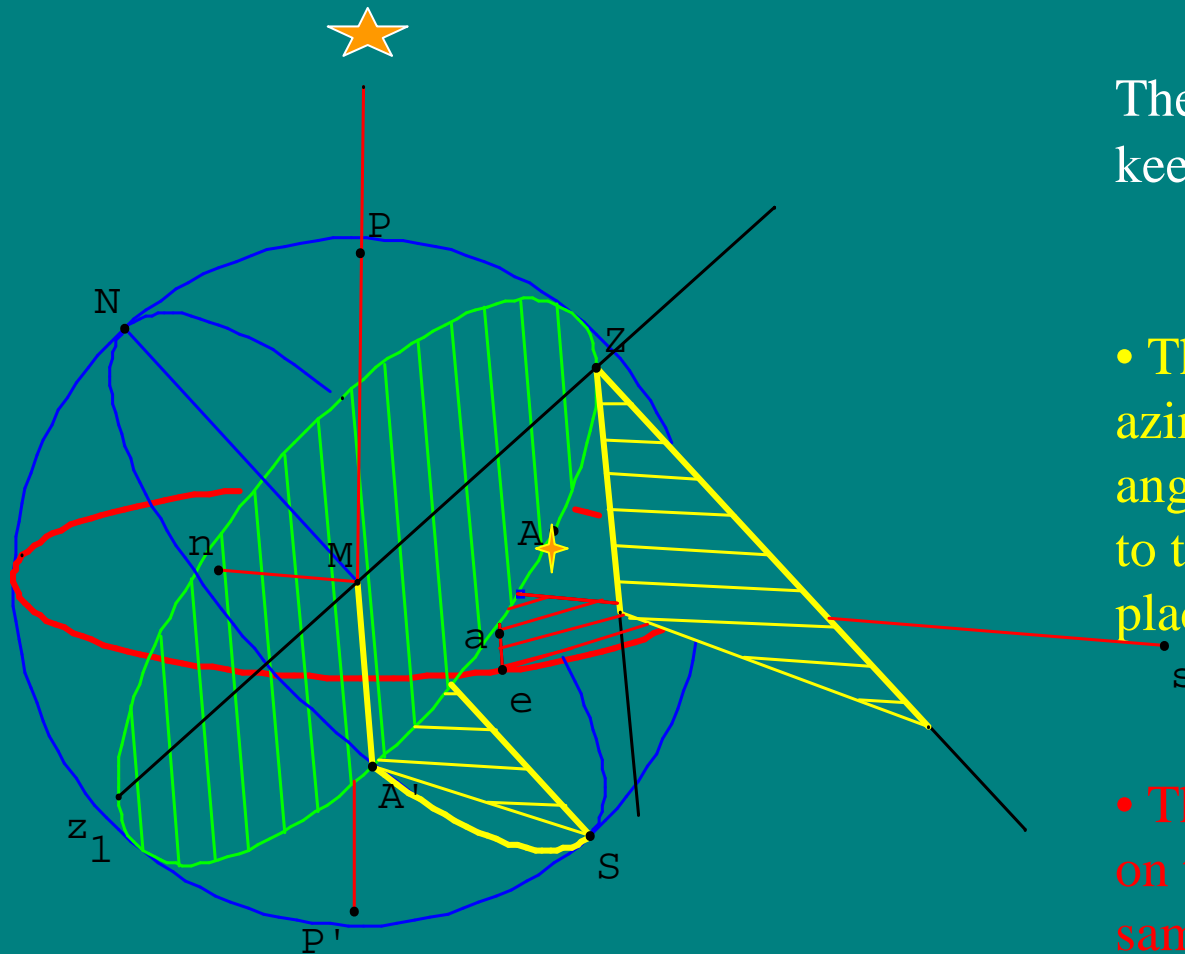


- the star A on the circle of altitude h , is projected onto a .

- the circle of diameter $[BD]$ is projected onto the circle of diameter $[bd]$

- the projection of the circle of diameter $[B'D']$, i.e the circle of equal altitude h is the circle of diameter $[b'd']$

PROJECTION OF AZIMUTHS



The stereographic projection keeps the dihedral angles.

- The angle SMA' , i.e the azimuth of A , is equal to the angle made by the tangents in Z to the meridian circles of the place and of the star.

- The projected angle (in red) on the equatorial plane has the same measurement az : it is the angle made by the tangents to the projections of the two meridians

prove that the 3 angles are equal !!

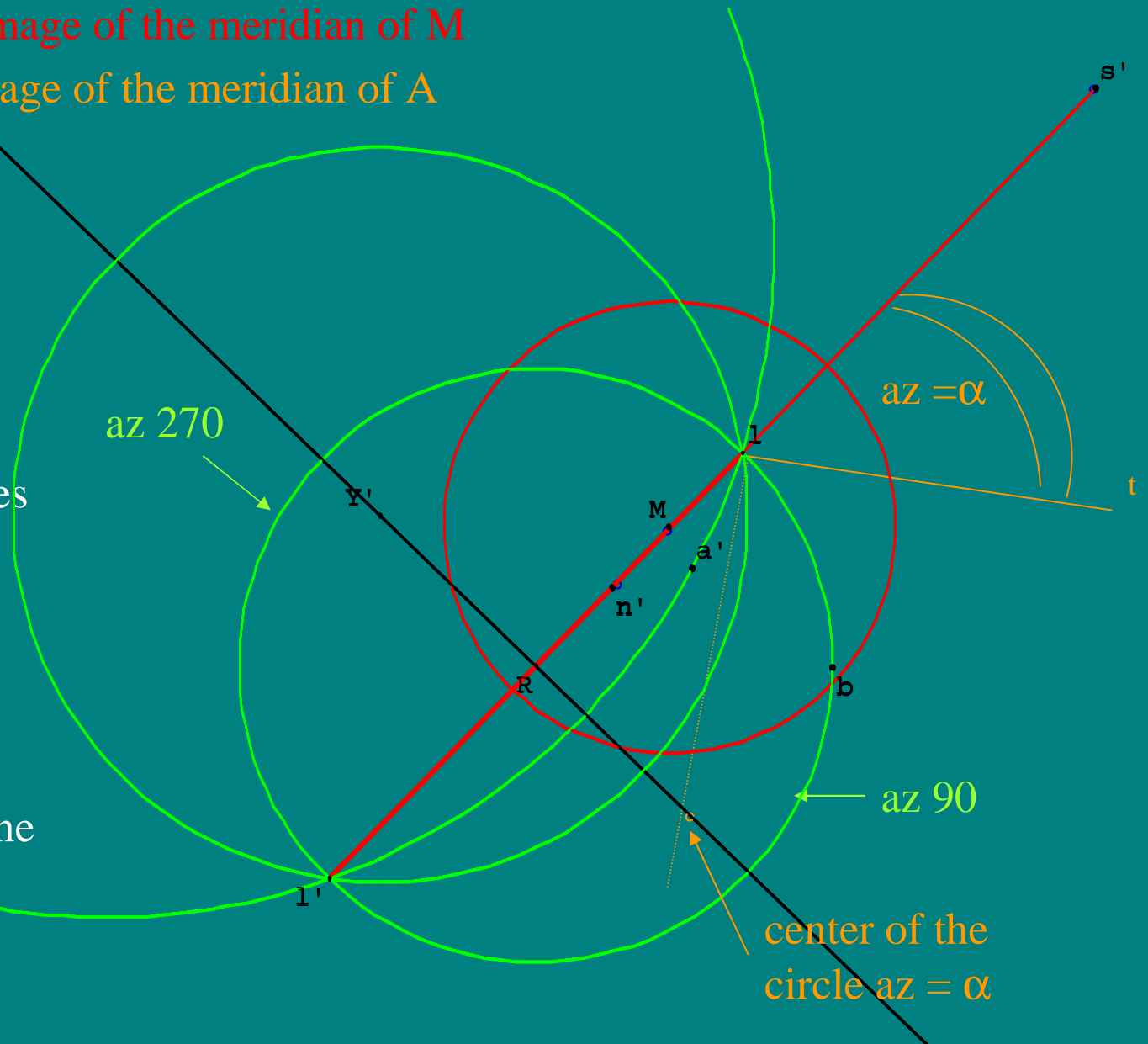
ON THE TYMPAN : CIRCLES OF EQUAL AZIMUTH

- ls' is tangent to the image of the meridian of M
- It is tangent to the image of the meridian of A

The centers of the circles of equal azimuth are located so :

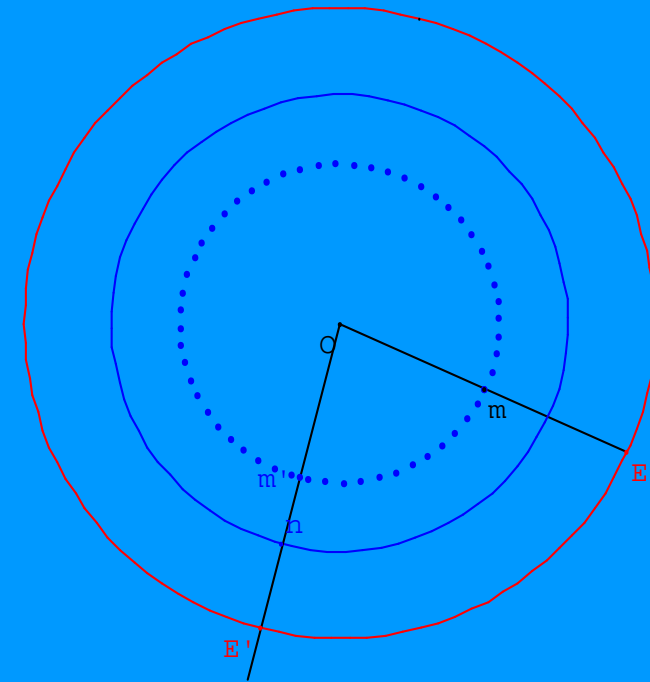
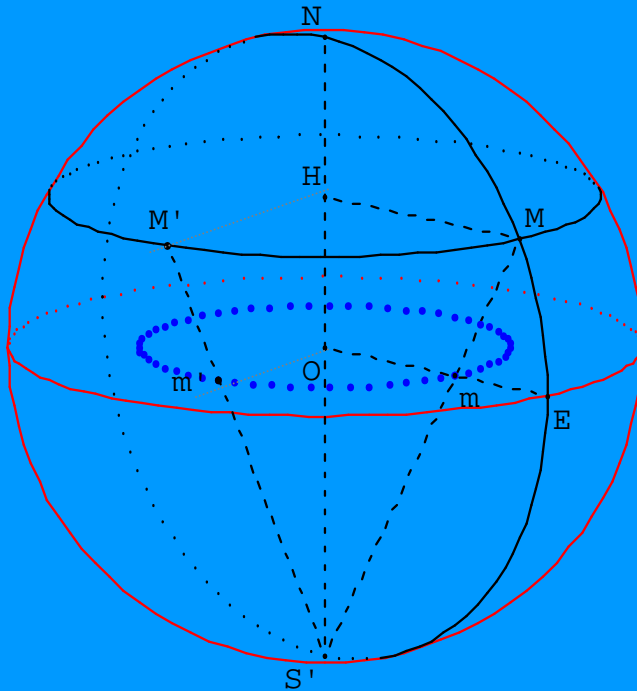
On the perpendicular bisector of $[ll']$

On the perpendicular line in l at $[lt)$



Les parallèles et leur projection

Les cercles parallèles au plan de l'équateur portent les astres de même déclinaison. Leurs images dans le plan équatorial sont des cercles concentriques.

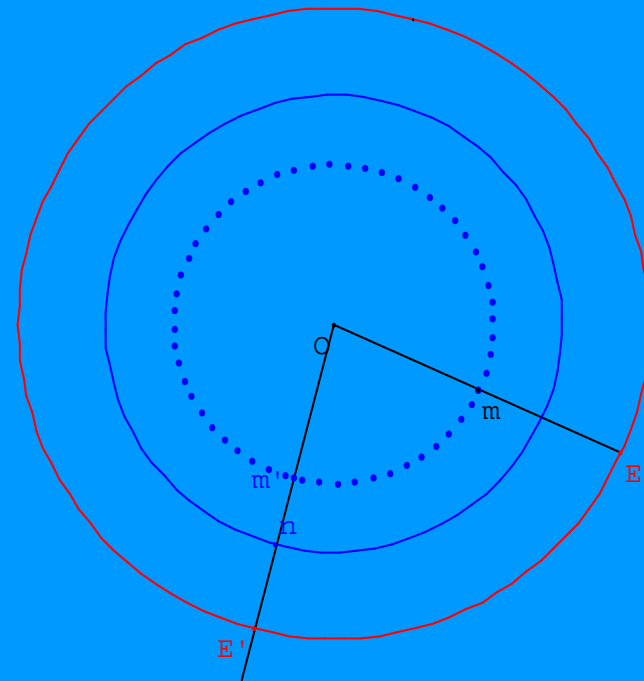
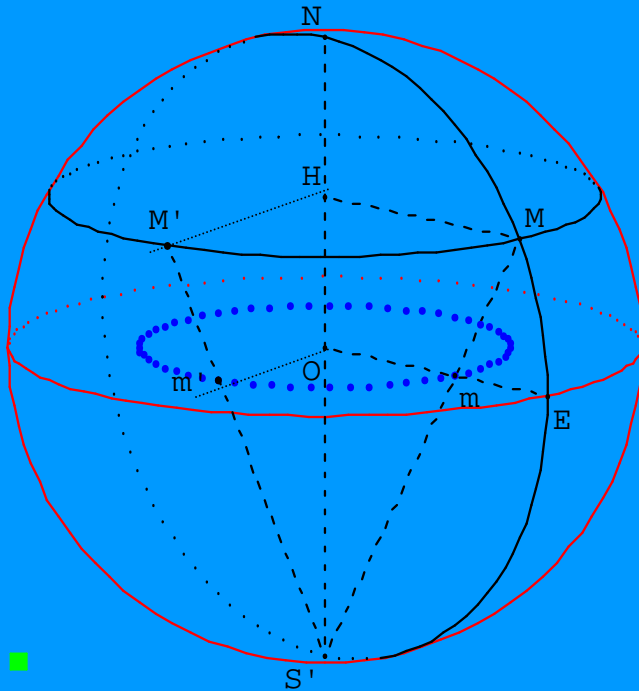


L'ascension droite sera mesurée par l'angle que fait le rayon $[Om]$ avec une direction de référence $[Om']$, celle du point vernal: γ



Parallel lines and their projection

Stars of equal declination are located on parallel circles to the equatorial plane. Their images on the equatorial plane are concentric circles.



The right ascension will be measured by the angle formed by the radius $[Om]$ and the reference direction $[Om']$ i.e that of the vernal point γ .