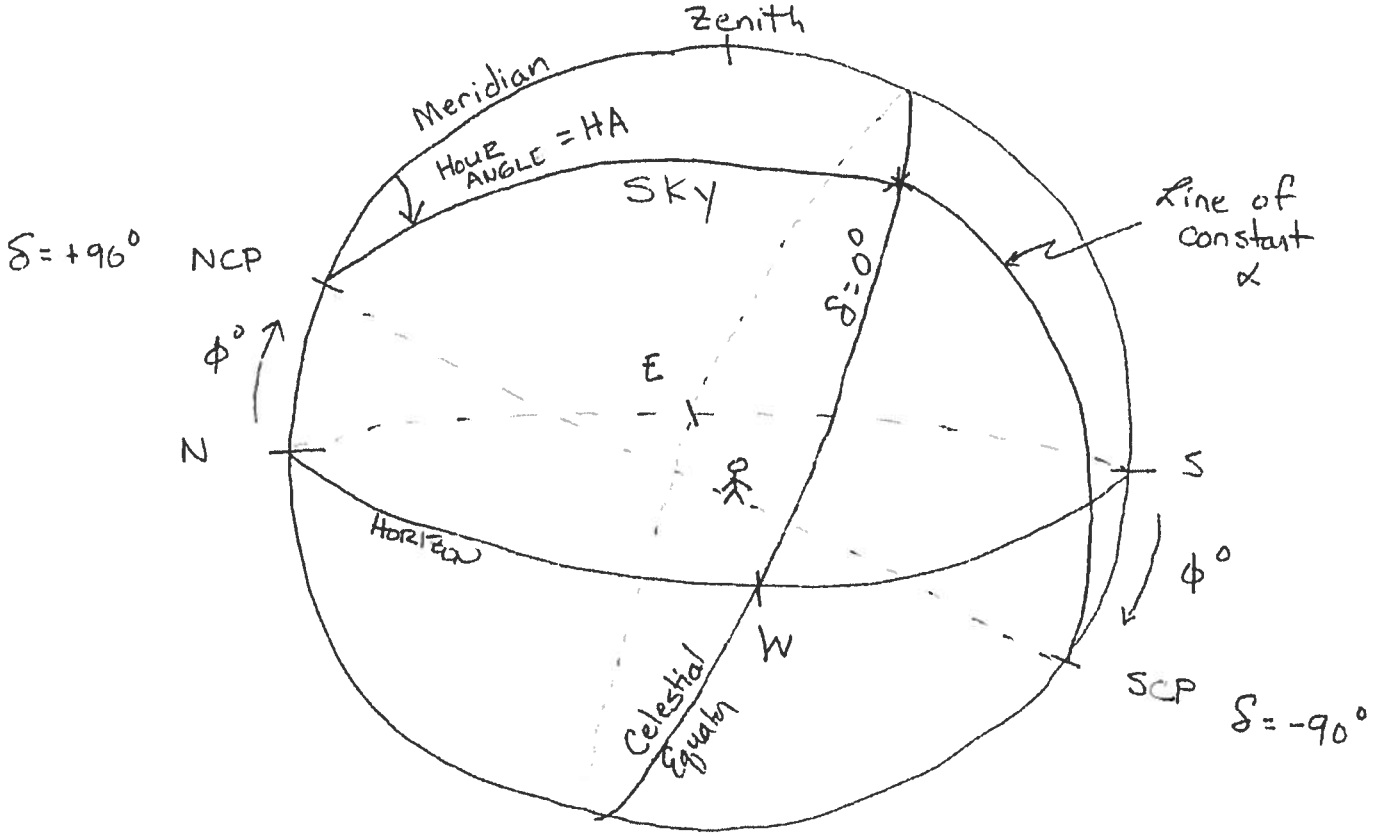
The Equitorial Coordinates are tipped by ϕ with respect to Horizon Coordinates:



Hour Angle ≡ HA ≡ the angle between the meridian and the line of constant α going through a source. HA is measured positive from ~~Zenith~~ the Meridian to the West.

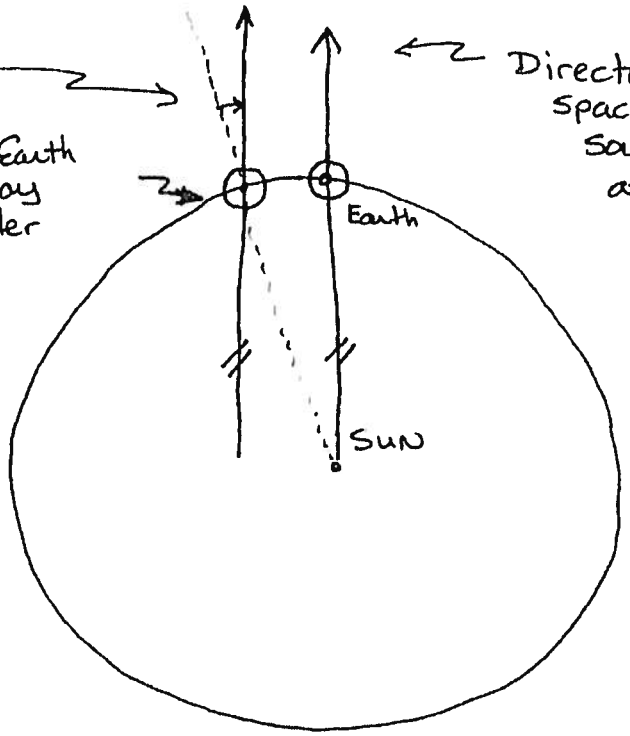
Because the celestial sphere appears to rotate with time due to Earth's rotation + revolution, we define

$$LST \equiv \begin{matrix}\text{LOCAL}\\ \text{SIDERIAL}\\ \text{TIME}\end{matrix} = HA + \alpha \quad \left(\begin{matrix}\text{units of}\\ h\ m\ s\end{matrix}\right)$$

So when $HA = 0$, $LST = \alpha$ LST tells you what α is currently transiting.

How fast does the sidereal clock run?

Since the Earth rotates around the sun, the source transits a little bit earlier than midnight the next day.



1 Tropical Year = 365.242190 days

But, with respect to the fixed direction in space, the Earth appears to have made 1 extra rotation.

So, $$\frac{1 \text{ sidereal sec}}{1 \text{ sec}} = \frac{1 \text{ day} + \text{TY days}}{1 \text{ TY days}}$$

$$= \frac{1 + 365.242190}{365.242190}$$

$$= 1.0027379093 \Rightarrow$$ The sidereal clock runs slightly faster.

If you add up this interval over 1 day (24^h), the difference is $3^m 56^s \Rightarrow$ stars transit $3^m 56^s$ earlier each night!