

# The June 5, 2012 Transit of Venus!

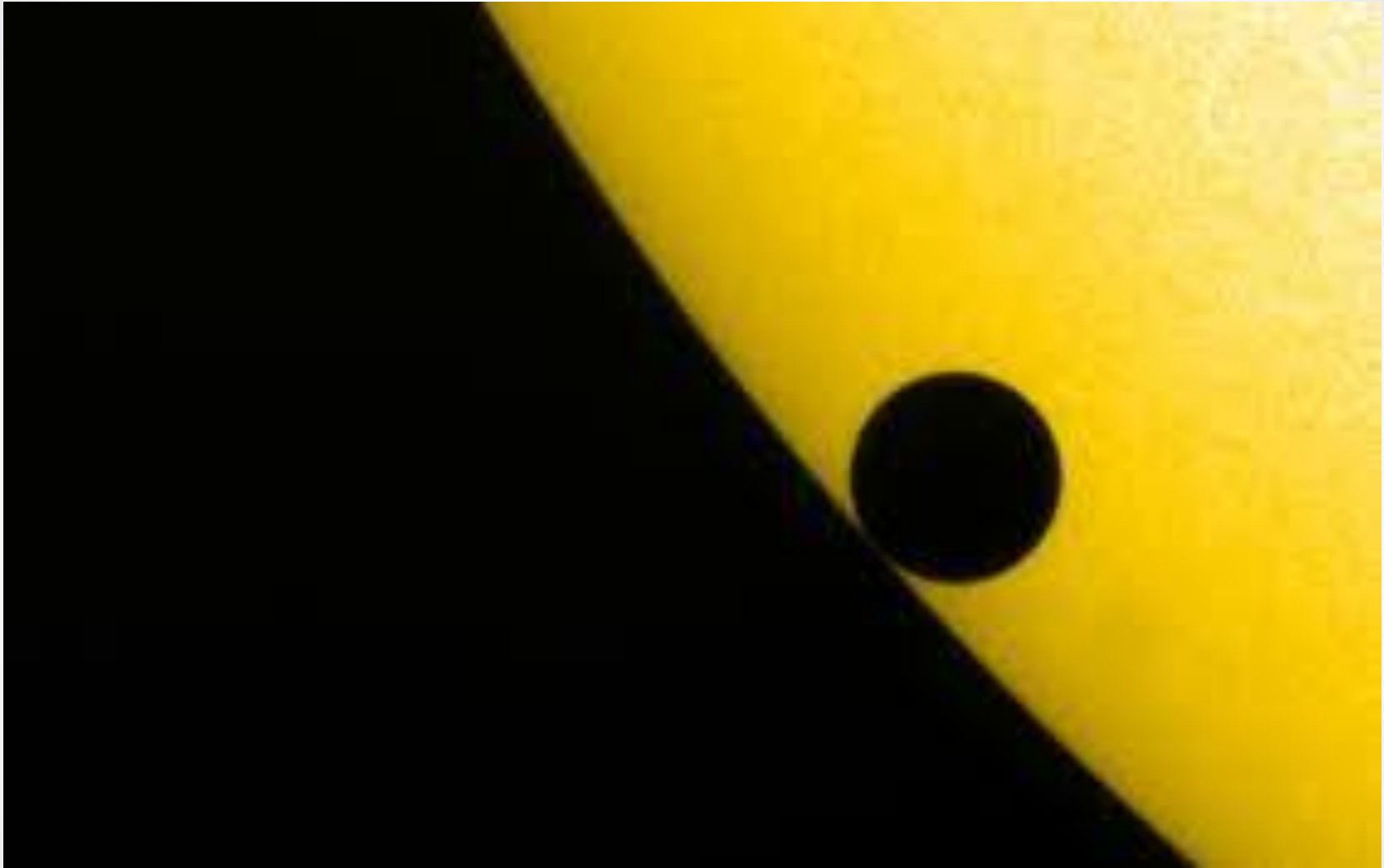
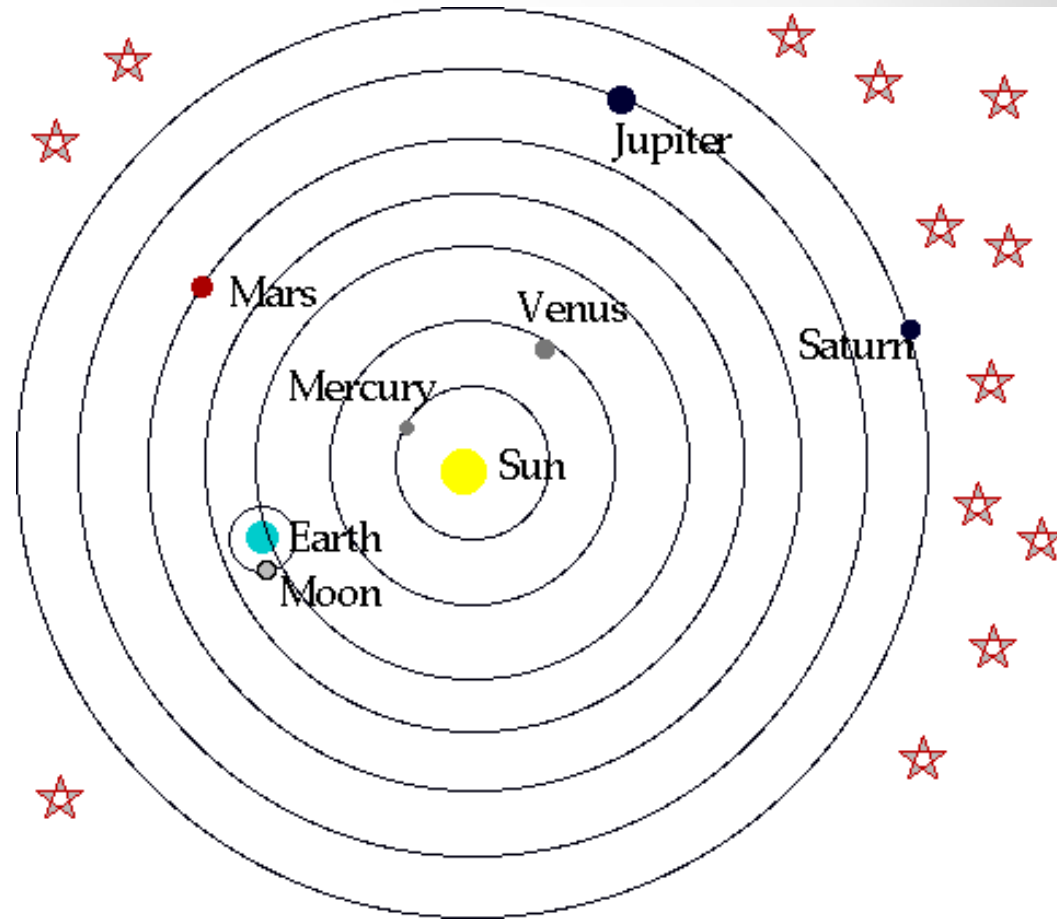


Image of the 2004 Venus transit across the Sun's disk

# Interior planets can “transit” across the Sun!

- ★ To “transit” across the Sun, a planet must (1) pass between the Earth and the Sun and (2) be along the same ecliptic plane as Earth at the time of the passing.
- ★ This means that only the 2 interior planets of **Venus and Mercury** can undergo a transit event.



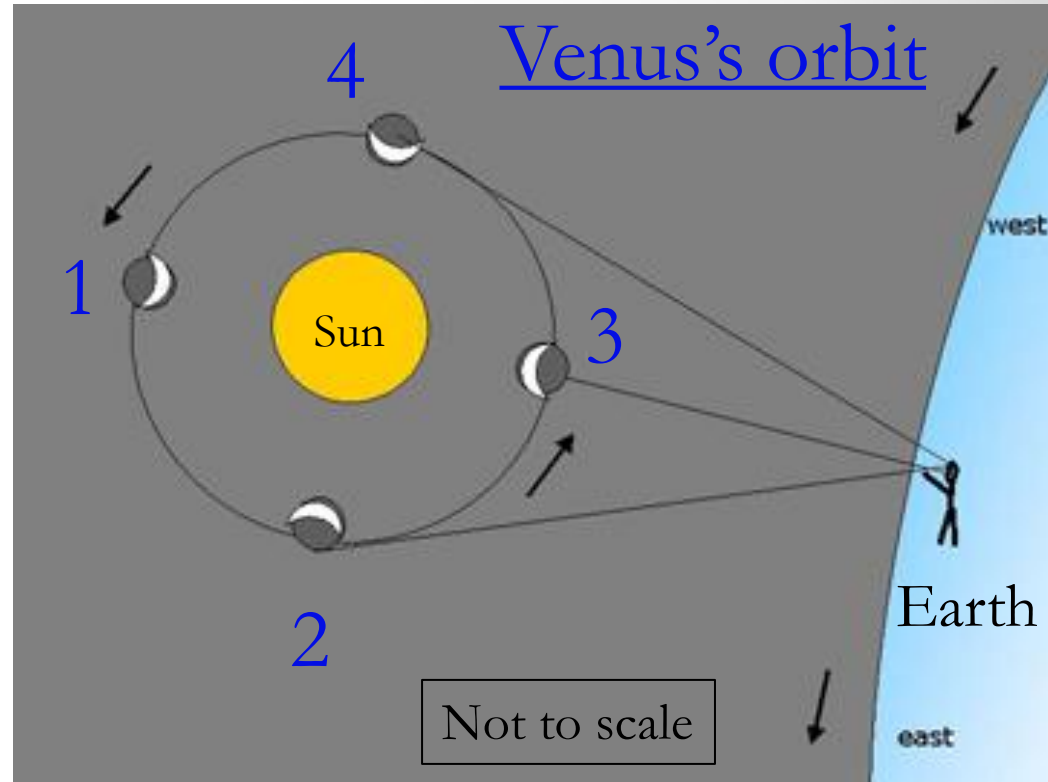
When an interior planet passes between the Earth and the Sun, it is said to be at **inferior conjunction**.

# Venus is an “interior” planet

Only planets that are interior to Earth go through phases and can experience “transits”.

As seen from Earth, Venus displays a gibbous shape between positions 1 & 2 and 4 & 1, and a crescent shape between positions 2 & 3 and 3 & 4.

Venus is lost in the Sun’s glare at positions 3 and 1 – inferior conjunction and superior conjunction respectively.



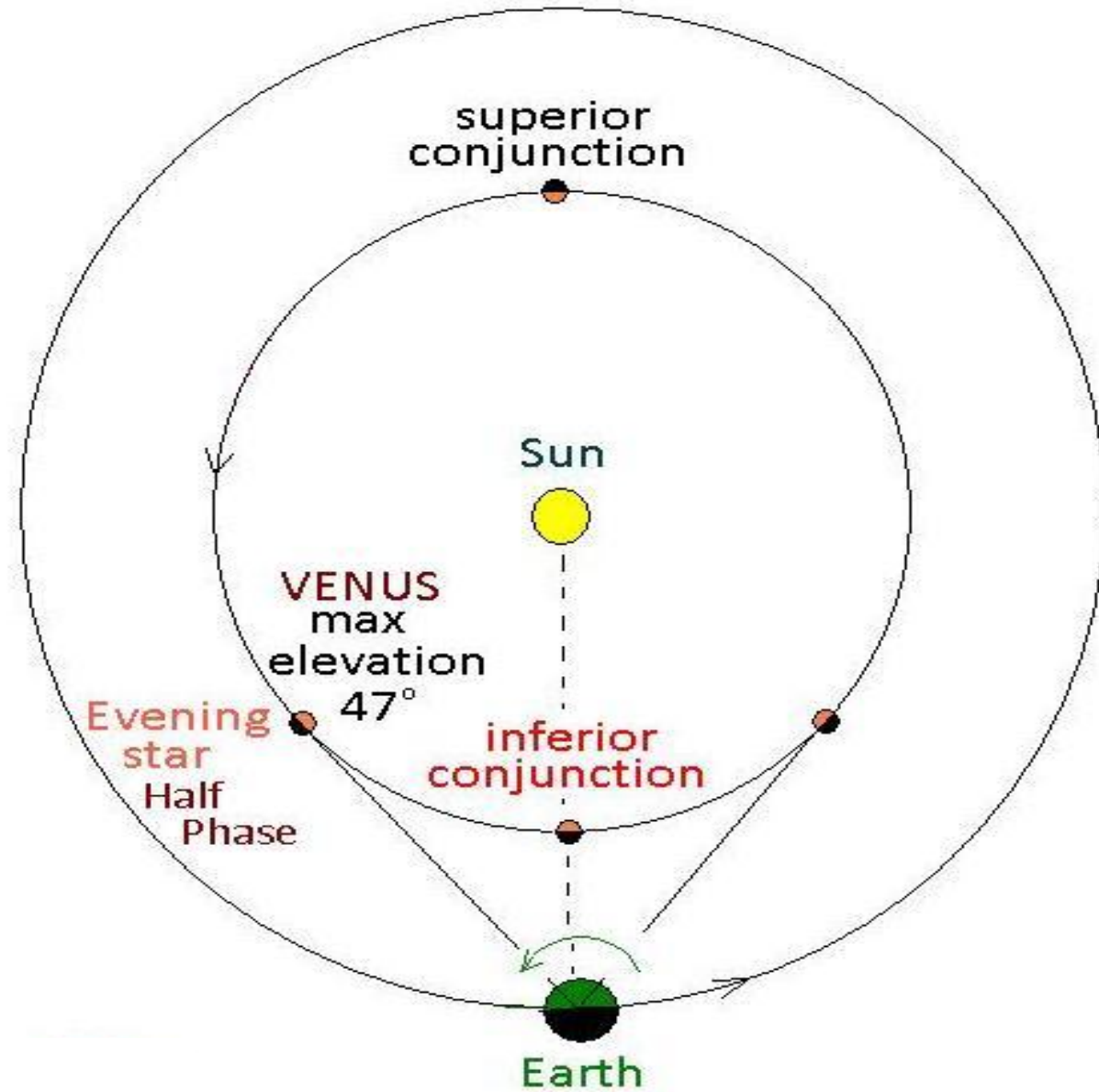
Venus is past position 2 and approaching position 3 in early June 2012.

# Venus is approaching a very special “inferior conjunction” with the Sun in June 2012

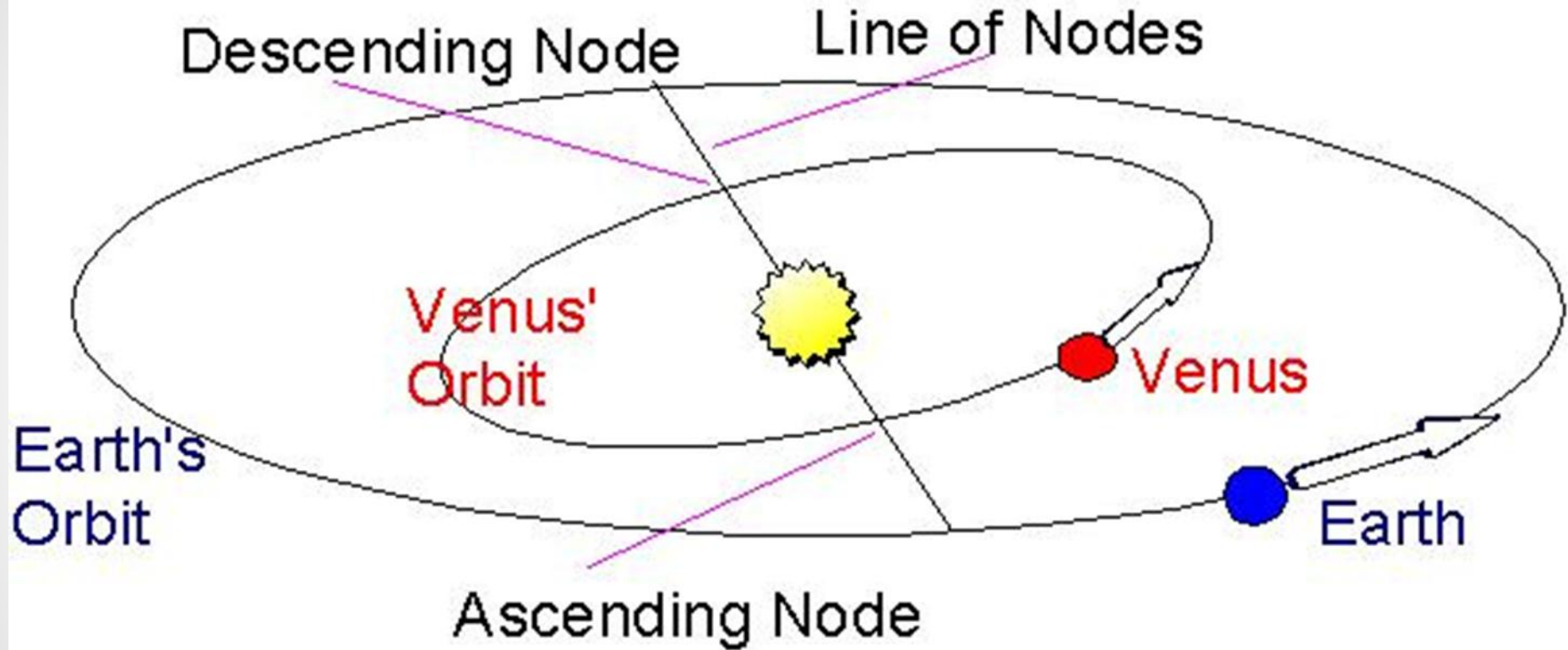
★ During this inferior conjunction, Venus passes near the plane of the Earth’s orbit with the Sun, wherein it can be seen crossing the Sun’s disk.

★ This “transit” event occurs in pairs with more than a century separating each pair.

## VENUS and EARTH in their ORBITS



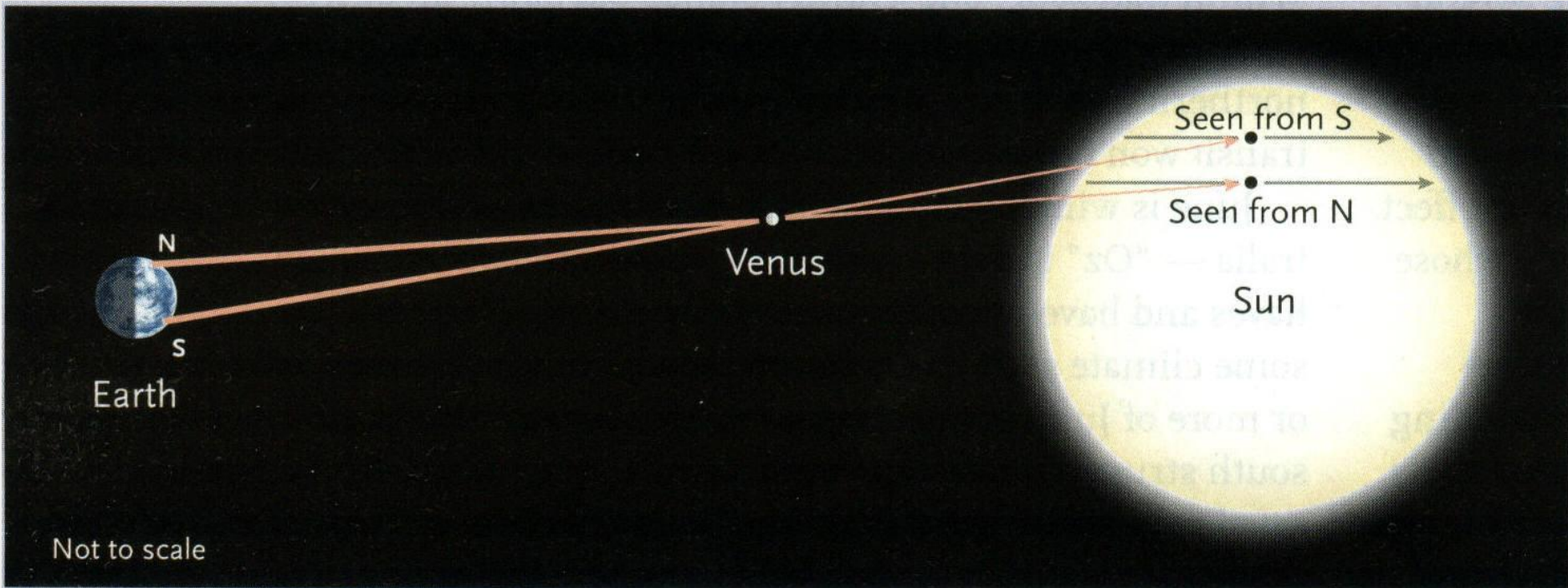
**Transits occur at or very near one of two “node” points in Venus’ orbit with Earth.**



The orbit of Venus is tilted  $3.4^\circ$  with respect to Earth's orbit, usually carrying it north or south of the Sun during conjunctions. Venus will be positioned at the **descending node** on the June 5, 2012 conjunction.



# The Venus Transit - another perspective



Profile of Venus at inferior conjunction while crossing a “node”.

# June 5, 2012 Transit of Venus

- ☆ Transits of Venus, at least for the next few millennia, are paired by an 8-year interval, followed alternatively by a hiatus of 105.5 and 121.5 years before the cycle repeats. The last Venus transit occurred in June 2004. So if you miss the June 2012 event, you'll have to wait until December 11, 2117 for the next show.
- ☆ Transits of speedy Mercury are more frequent – about 14 per century. The last Mercury transit occurred in November 2006 and the next one will occur in May 2016.

# Transit of Venus of 2012 June 05/06

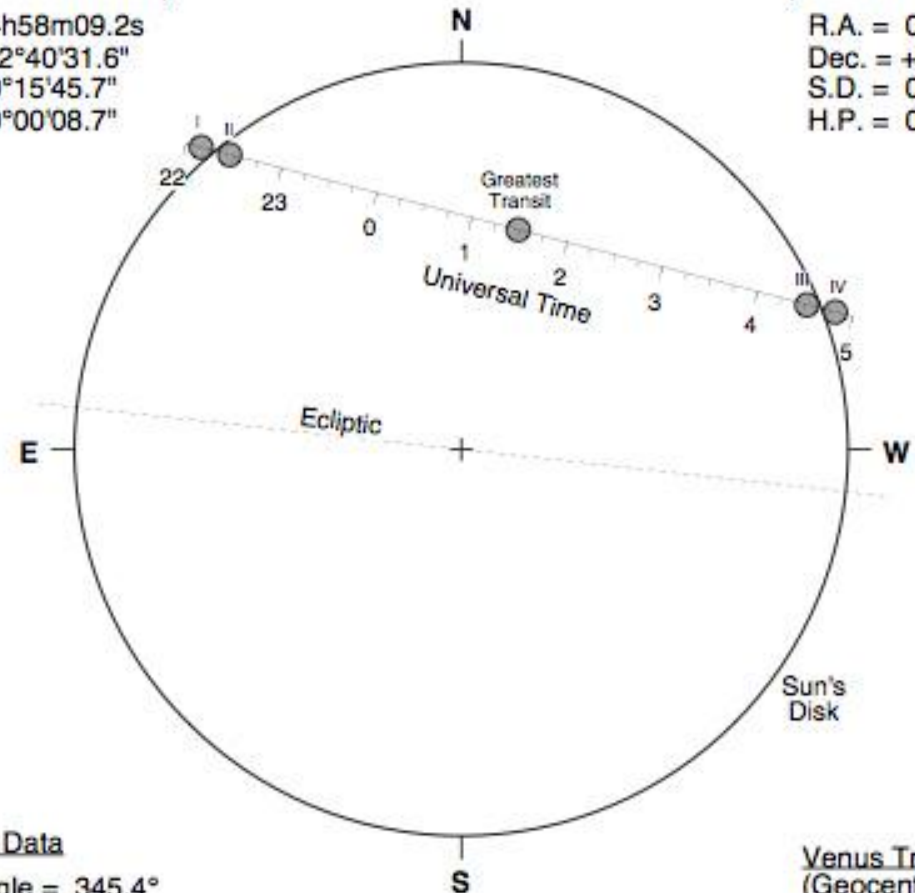
Greatest Transit = 01:29:36.3 UT      J.D. = 2456084.562225

## Sun at Greatest Transit (Geocentric Coordinates)

R.A. = 04h58m09.2s  
Dec. = +22°40'31.6"  
S.D. = 00°15'45.7"  
H.P. = 00°00'08.7"

## Venus at Greatest Transit (Geocentric Coordinates)

R.A. = 04h57m58.8s  
Dec. = +22°49'25.9"  
S.D. = 00°00'28.9"  
H.P. = 00°00'30.5"



## Geocentric Data

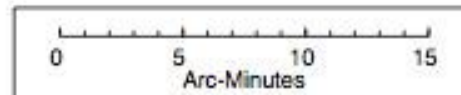
Position Angle = 345.4°  
Separation = 554.4"  
Duration = 06h40m

## Ephemeris Data

Eph. = VSOP87  
 $\Delta T = 66.7$  s

## Venus Transit Contacts (Geocentric Coordinates)

I = 22:09:38 UT  
II = 22:27:34 UT  
Greatest = 01:29:36 UT  
III = 04:31:39 UT  
IV = 04:49:35 UT



F. Espenak, NASA's GSFC - 2011 Jun  
[eclipse.gsfc.nasa.gov/OH/transit12.html](http://eclipse.gsfc.nasa.gov/OH/transit12.html)

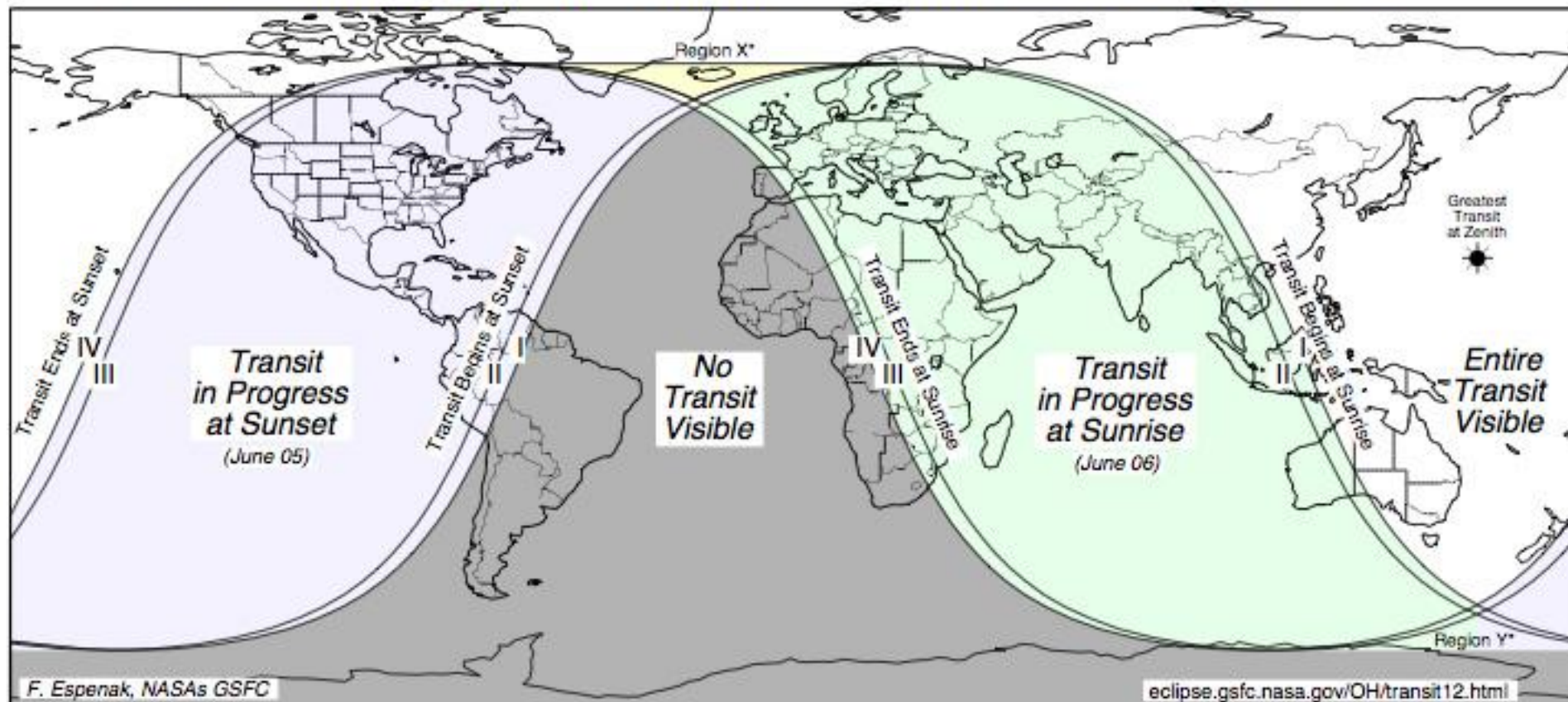
In Asheville we will not see the entire transit on June 5, 2012.

We will see its beginning at about 6:05 p.m. and the initial 2 hours of this 6.5 hour event as the Sun sets on us during the transit.



# The complete transit will be visible in the mid and western Pacific region

## Global Visibility of the Transit of Venus of 2012 June 05/06



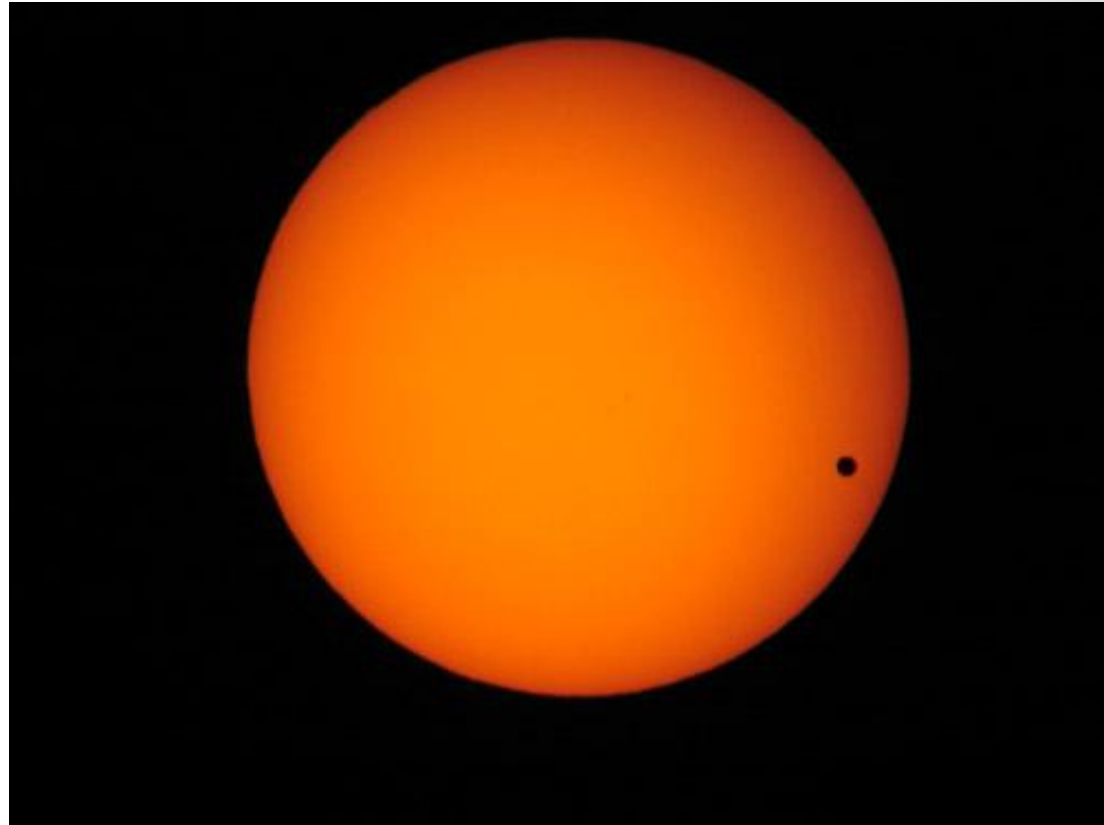
\* Region X - Beginning and end of Transit are visible, but the Sun sets for a short period around maximum transit.

\* Region Y - Beginning and end of Transit are NOT visible, but the Sun rises for a short period around maximum transit.

# The June 5, 2012 Transit of Venus

At a distance from Earth of only 27 million miles on June 5th, Venus' silhouette will appear about 1 arc minute in size.

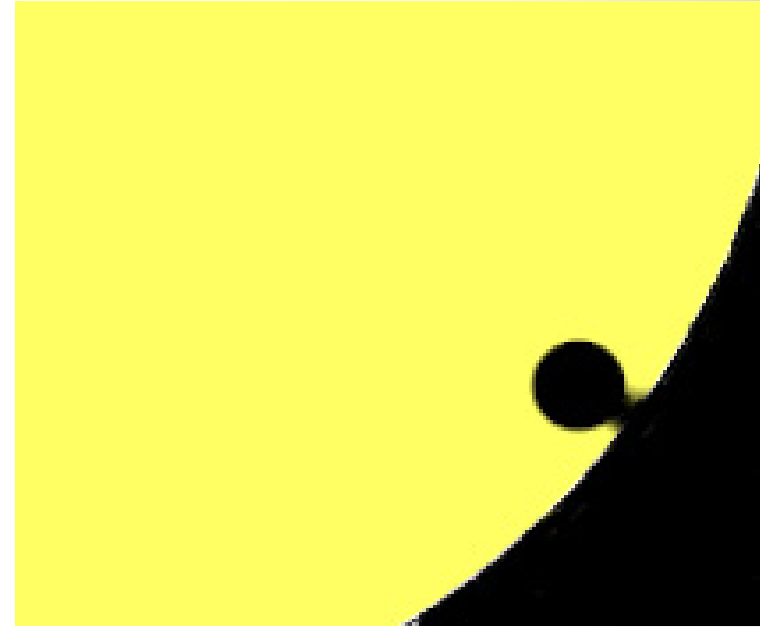
That's large enough to view the disk of Venus with the unaided eye (no magnification) on the Sun's orb.




**Of course, never look directly at the Sun without an approved solar filter for eye protection.**

# The “black drop effect”

Unfortunately, the limitations of the telescopes and other factors gave rise to a hindrance called the "black drop effect." When the edge of Venus appears just about to touch the inside edge of the Sun, an annoying ligament suddenly appears between the well-defined edges. This distortion confounded the accurate timing of transits by a few seconds.

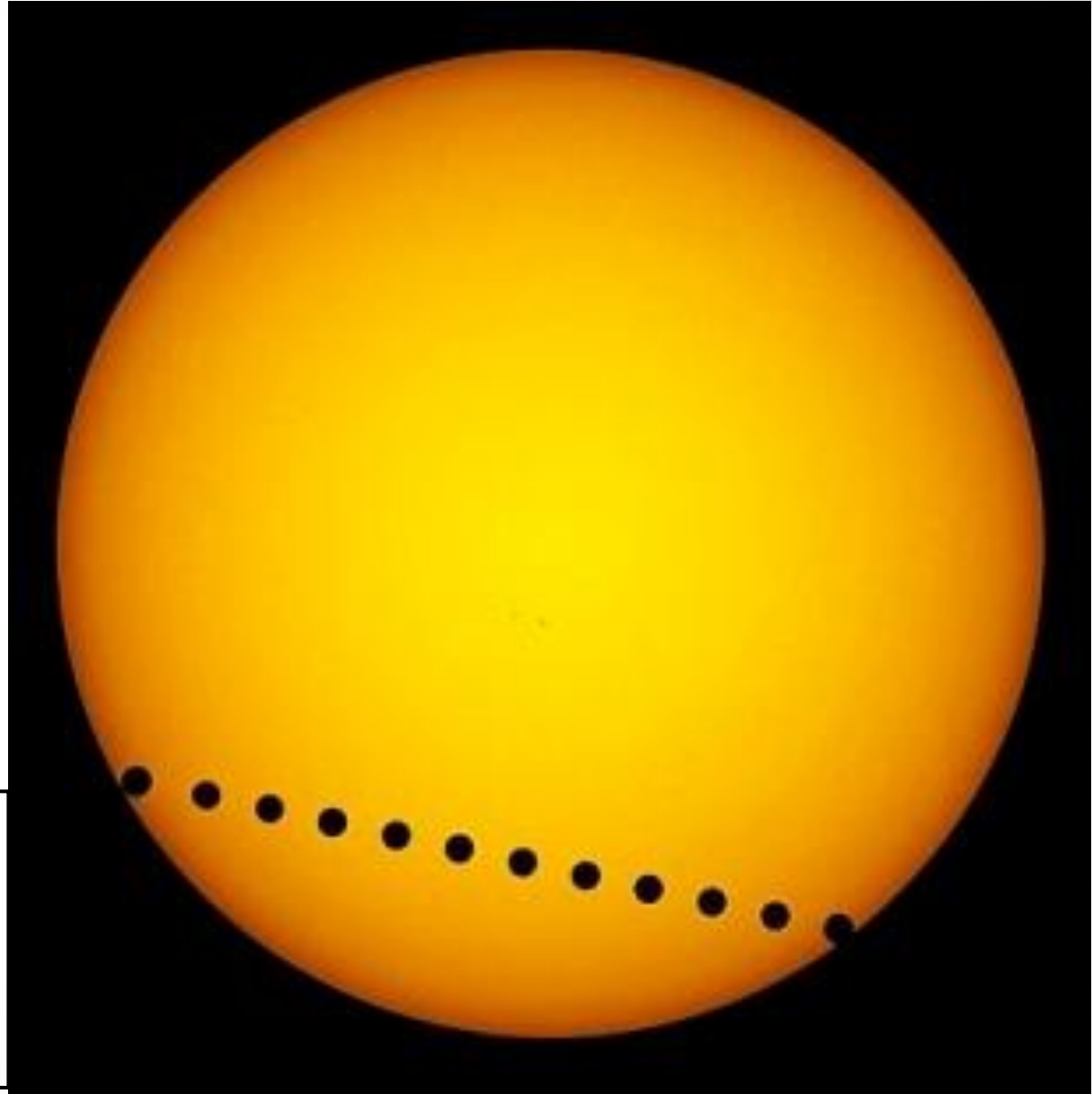


The effect can be simulated by holding your nearly-pinched thumb and index finger together in front of a bright light. Before they touch, a dark shadow seemingly joins the two digits. 

# Venus transiting the Sun on June 8, 2004 from Egypt

The next Venus transit occurs in 2117, so don't miss this one on June 5, 2012 → it's your once-in-a-lifetime chance, unless you saw the one in 2004!

**So you don't turn your retina to charcoal, use a solar filter to see this naked-eye event.**



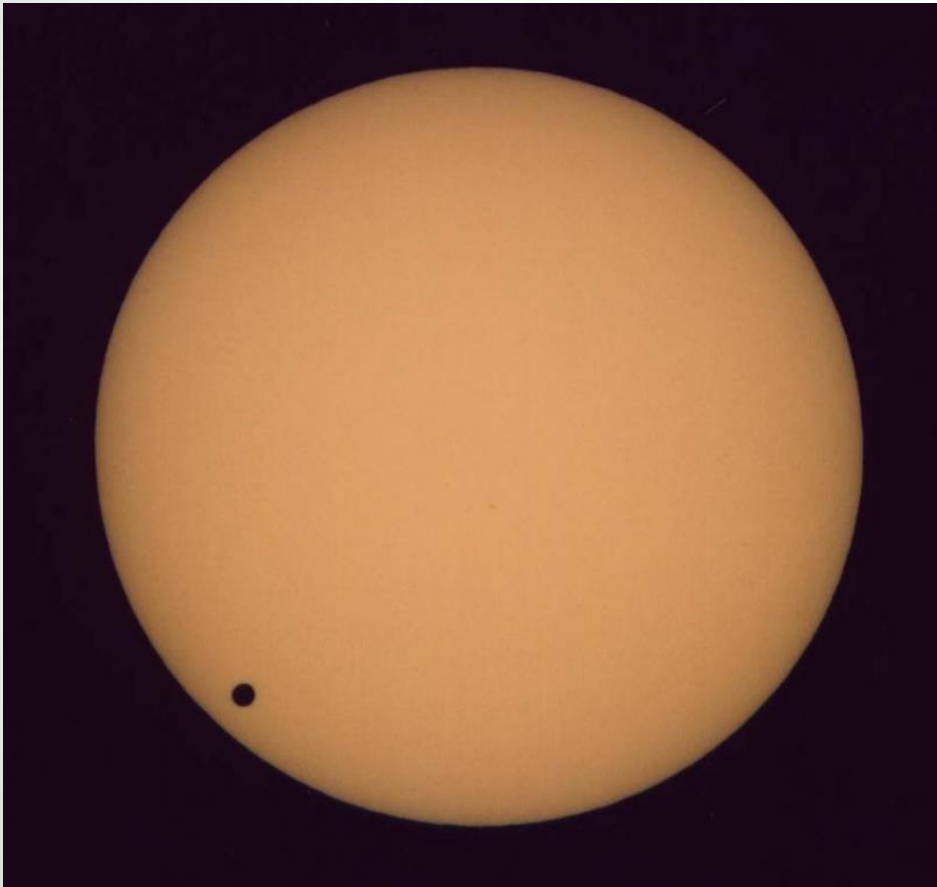
# See the June 5, 2012 transit of Venus in Asheville

- ☆ On June 5<sup>th</sup> The **Astronomy Club of Asheville** will have telescopes with safe solar filters set up for observing the transit of Venus at the **Asheville Area Chamber of Commerce's west parking lot**.
- ☆ Folks are invited to come and observe this event through our safe solar telescopes beginning about 6:00 p.m..
- ☆ Check out the club's website for directions and more details:

<http://www.AstroAsheville.org>



# A Venus Transit seen through 2 different solar filters



The Photosphere  
in “white” light



The Chromosphere  
in Hydrogen-Alpha

# More Venus Transit images

